NORTHROP

CIVIL ENGINEERING REPORT:

SCEGGS Darlinghurst Wilkinson Building

215 Forbes Street, Darlinghurst NSW 2010

PREPARED FOR
Sandrick Project Directions
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Tel: 02 8860 9494

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Civil Engineering Report:

Revision Schedule

Date	Revision	Issue	Prepared By	Approved By
20.09.2021	1	For Review	V. Khuu	G. Collins
19.11.2021	2	For Submission	G. Collins	G. Collins
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1. General

1.1 Introduction

Northrop Consulting Engineers Pty Ltd (Northrop) have been engaged by Sandrick Project Directions to prepare the Civil Engineering design and documentation in support of a Development Application submission to City of Sydney for the proposed SCEGGS Darlinghurst Wilkinson Building development at 215 Forbes Street, Darlinghurst NSW 2010.

This report covers the works shown as the Northrop Drawing Package required for the development of the site including:

- Flood Study;
- Stormwater Drainage;
- Stormwater Detention;
- Stormwater Quality / Water Sensitive Urban Design;
- Water Quality;
- Sediment and Erosion Control;

1.2 Related Reports and Documents

This report is to be read in conjunction with the following reports and documents:

- Northrop Drawings
    - DAC01.11 – Specification Notes
    - DAC02.01 – Sediment and Soil Erosion Control Plan
    - DAC02.11 – Sediment and Soil Erosion Control Details
- Stormwater Drainage Manual prepared by City of Sydney February 2017
- City of Sydney WSUD Technical Guidelines prepared by alluvium, October 2014
- City of Sydney Interim Floodplain Management policy - May 2014
- Woolloomooloo catchment Floodplain Risk Management Study prepared by City of Sydney, April 2016
- Master Stormwater and Flood Report prepared by TTW, August 2018
- NSW Floodplain Development Manual (DIPNR, 2005).
- Sydney Water On-site stormwater detention guide, June 2020

1.3 The Development

1.3.1 Proposed Development

The proposed development site SCEGGS Darlinghurst Wilkinson Building is located at 215 Forbes Street, Darlinghurst NSW 2010 which is located within the suburb of Darlinghurst in the City of Sydney Local Government Area (LGA).

Development consent has previously been granted for concept approval for the master plan of the site under SSD application 8993. As part of the previously approval the Wilkinson building which this report is limited to (referred to as Stage 1 works in the SSD) was proposed to be demolished and rebuilt. The existing building was noted to have heritage significance and as such will not be demolished, with the façade of the building to remain and footprint of the building to remain. This report therefor proposed to modify the existing stormwater strategy to account for a now reduced impervious area which now matches the existing scenario.

The overall site is bounded by Bourke St, Forbes St and St Peters Street in Darlinghurst. The existing Wilkinson building interior will be demolished to make way for a new Wilkinson Building that retains the existing façade with an addition to the southern façade of the building comprising of the lift core and new meeting rooms. The new Wilkinson House building will have a footprint of 432m^2. The location of Wilkinson House is shown in Figure 1 below.

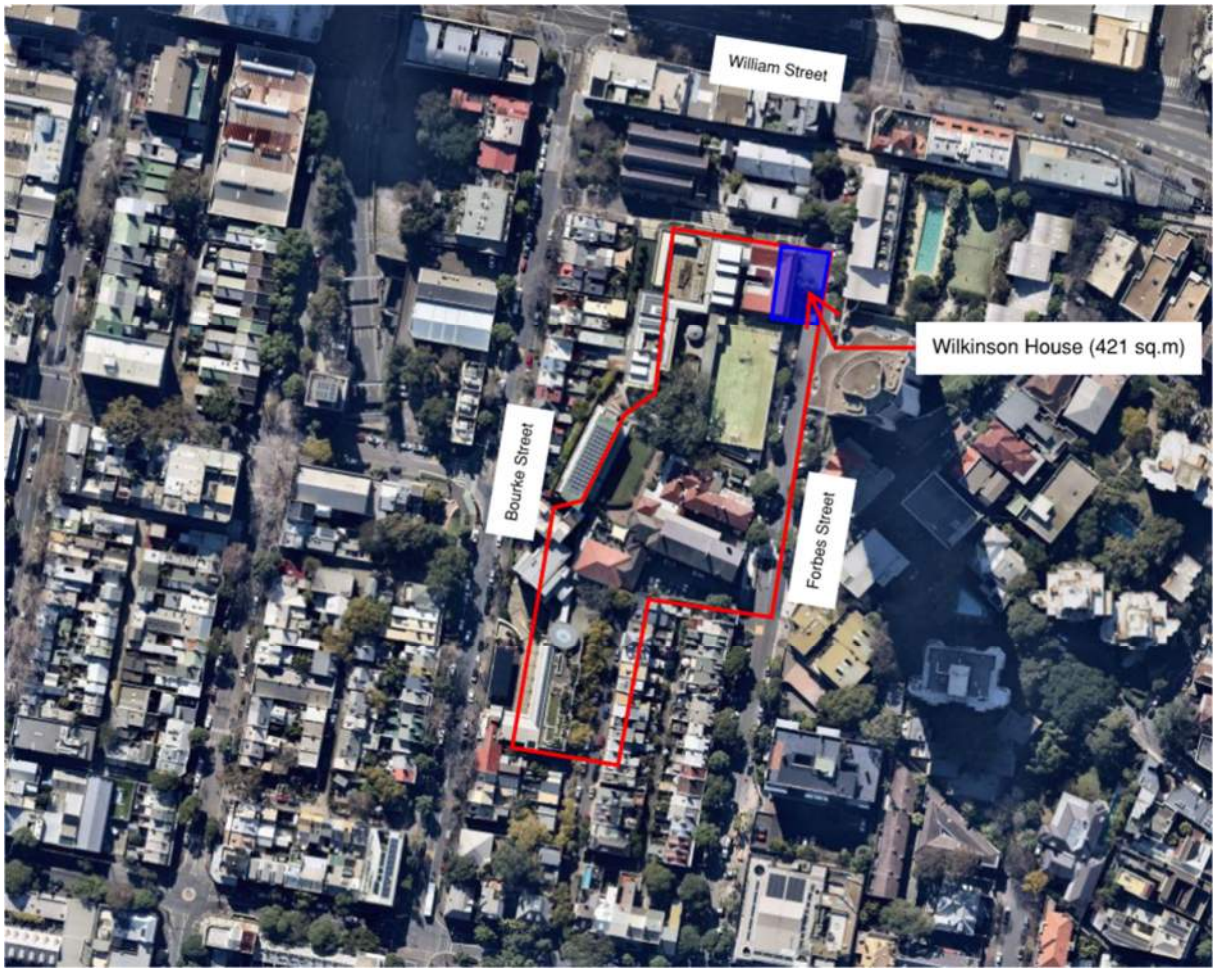

Figure 1: Location of Wilkinson House at SCEGGS Darlinghurst

2. Flooding

2.1 Site Flooding Information

The site has been identified in the WMA water Woolloomooloo Flood Study for the City of Sydney as being minorly affected by flooding during the 100-year ARI flood event. The study has assessed the flood impacts across the catchment for the 100 year and PMF storm events. Based on the report as shown in Appendix B, the site will be minimally impacted by overland flows from each of the above storm events. Predicted flood levels in the vicinity of the site has been presented in figure 2 below and summarized in Table 1 below.

Table 1: Flood Levels and Depths across site

Location	1% AEP Peak Flood Depth (m)	PMF Peak Flood Depth (m)
A – St Peters Street	< 0.1 m	0.1 – 0.2 m
B – Corner of Forbes Street and St Peters Street	0.1 – 0.2 m	0.1 – 0.2 m
C – Forbes Street	< 0.1 m	0.1 – 0.2 m

Figure 2: Peak Depth of the 100-year ARI flood event (WMA Water, 2016)

2.2 Proposed Flood Management Strategy

According to City of Sydney Interim Flood Management Policy, School facilities are categorized commercial land uses. Given the potential risk of stormwater/flood inundation through the proposed development, the proposed finished level for new buildings constructed across the site should be set at the flood planning level.

According to Council's Local Environmental Plan (2012), the flood planning level is defined as the 1 in 100 ARI flood level plus 0.5 m freeboard. The ponding in front of Wilkinson House is less than 100m in the 100-year ARI event and will be sufficiently contained within the kerb and gutter system on the western side of Forbes Street. The flood planning level for the Wilkinson Building is taken as the invert of the kerb on Forbes Street plus 0.5m. The invert level of the kerb in front of the current Forbes Street entrance to the Wilkinson House Building is approximately 31.78m AHD. This results in a Flood Planning Level of RL32.38m AHD for this entrance of the Wilkinson Building. The ground floor of the Wilkinson Building has a finished floor level of RL 33.30m AHD which is compliant with the flood planning level.

The building additionally has a proposed lower ground floor with a single egress door to St Peters Street at the Northwestern corner of the building. There is no overland flow path identified on the Southern side off the Street with cross falls falling steeply to the Northern gutter as identified in the flood maps. The invert of gutter opposite this door is 28.62. This results in a flood planning level at this doorway of 29.22 AHD, with the Floor level set at RL 29.68m AHD which is also compliant with the flood planning level.

The overland flow study conducted by TTW (2018) shows that the 100-year ARI flood event will result in flood depths on Thomas Street of up to 1m in depth which will flow through the school property and into Bourke Street as shown in Figure 3 below. This does not impact the Wilkinson House site.

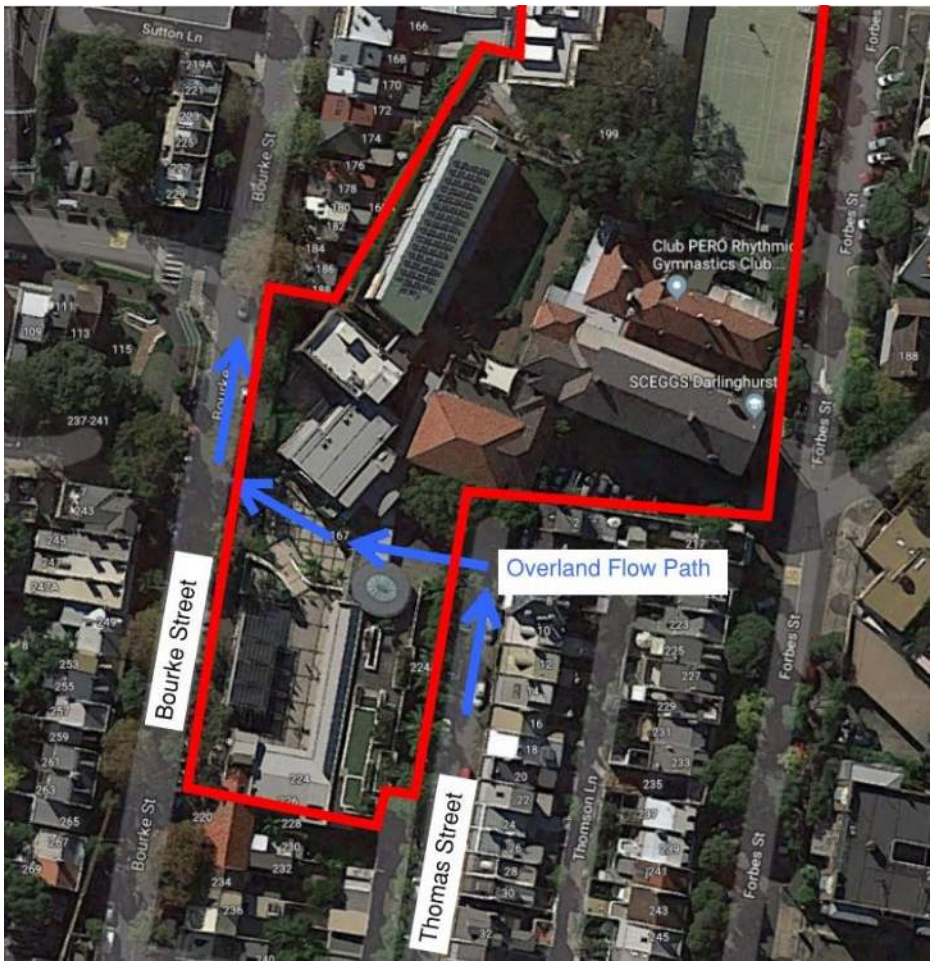

Figure 3: Overland Flow Path from Thomas Street to Bourke Street.

2.3 Recommendations

Given the proposed use, the proposed development will need to be designed and constructed to confirm with Council flood protection requirements including:

- Finished floor levels set at or above the flood planning level (as defined above).
- No hazardous materials are to be stored in areas below the 100-year ARI flood level.
- All critical services and associated infrastructure and equipment (including electrical
- equipment) is to be set above the 100-year ARI flood level.
- Depth velocity values across the site are to be no greater than that specified in the Australian
- Rainfall & Runoff guidelines.
- The proposed development does not obstruct the flow path of the above overland flows.
- Flood planning levels for the relevant spots across the site is presented in table 2 below.

3. Stormwater Management

3.1 Objectives and Controls

The stormwater strategy for the SCEGGS Darlinghurst Wilkinson Building development has been developed in accordance with City of Sydney Development Plan (DCP) and Water Sensitive Urban Design guidelines.

The DCP outlines the following aims:

a) Protect and enhance natural watercourses and their associated ecosystems and ecological processes;
b) Minimise potable water demand and wastewater generation;
c) Minimise stream erosion by matching the post-development runoff regime to the pre-development or natural water runoff regime;
d) Mitigate the impacts of development on water quality and quantity;
e) Mitigate the impacts of development on groundwater, particularly in saline groundwater environments;
f) Ensure any changes to the existing groundwater regime do not adversely impact upon any other properties and the environment;
g) Integrate water cycle management measures into the landscape and urban design to maximise amenity;
h) Minimise the potential impacts of development and other associated activities on the aesthetic, recreational and ecological values of receiving waters;
i) Minimise soil erosion and sedimentation resulting from site disturbing activities; and
j) Ensure the principles of ecologically sustainable development are applied in consideration of economic, social and environmental values in water cycle management.

3.2 Stormwater Management Overview

A stormwater management plan for the SCEGGS Darlinghurst Wilkinson Building development has been prepared by Northrop in order to satisfy the aims of the DCP as stated above. The key elements of the stormwater management include:

- Quantity (detention storage);
- Quality;
- Drainage network;

3.3 Stormwater Quantity Management

3.3.1 On-Site Detention

Sydney Water on-site detention requirements state that developments do not require on-site stormwater detention in the case that an existing building is being refurbished, and the existing drainage system is to be maintained. This development involves the upgrade of an existing building whilst retaining the external façade and an addition to the southern façade. There has been no change to impervious areas as a result of the development.

Hydraulic modelling conducted by TTW in the Masterplan Stormwater and Flood Study provide the following permissible site discharge (PSD) as summarised in Table 2 below.

Table 2: Permissible and Proposed Discharge for Wilkinson Building

	PSD	Proposed Site
1-year ARI	9.1 L/s	9 L/s
100-year ARI	23 L/s	19 L/s

Due to the relatively small discharge volume, stormwater quantity management can be achieved by connecting the roof drainage system to the existing OSD tank for the Car Park to the West. The existing OSD tank was designed by HughesTrueman in 2008 and the Stormwater DA Report is in Appendix C.

3.4 Stormwater Quality Management

3.4.1 Adopted Water Quality Objectives

The stormwater quality management aims to reduce the pollutant load of stormwater runoff using a series of treatment devices prior to discharge into receiving waters.

Stormwater quantity and quality management measures have been modelling using MUSIC software. The targets for stormwater quality are outlined in Section 3.7.3 of the Sydney of Sydney DCP (2012) are presented in Table 3 below:

Table 3 - Water Quality Targets

Pollutant	% Reduction Post-Development Average Annual Load Reduction
Gross Pollutants	90
Total Suspended Solids (TSS)	85
Total Phosphorous (TP)	65
Total Nitrogen (TN)	45

3.4.2 Stormwater Quality Management Scheme

The proposed water quality treatment train incorporated to meet the required targets can include the following options:

Option A:

The treatment train for Wilkinson House as outlined in the TTW Stormwater and Flooding Masterplan consists of a proprietary filter and the existing OSD tank in the Carpark Building. Stormwater will be collected from the roof of the Wilkinson Building and be treated by a Stormwater360 Jellyfish 7.5 L/s filter (or equivalent) before entering the detention tank and then discharging to the street drainage on St Peter's Street.

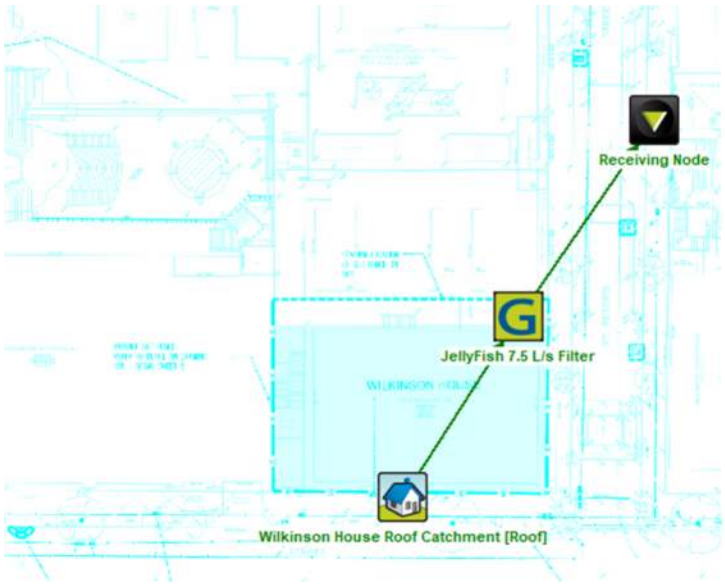

Figure 4: Proposed Treatment Train – Option A

Option B:

An alternate treatment train for Wilkinson House consists of a proprietary OceanProtect StormFilter precast pit of size 1200 x 1200 (1.4m^2) and 3 x 690 Psorb Stormfilter cartridges prior to entering the detention tank and discharging to the street drainage on St Peter's Street.

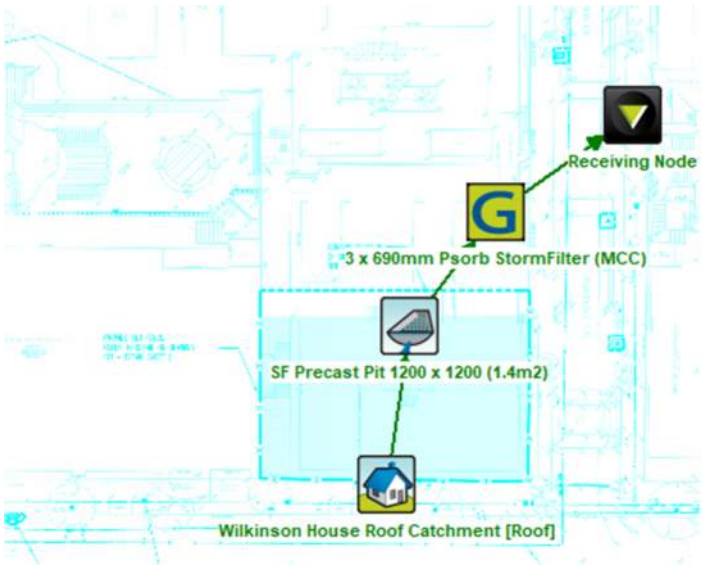

Figure 5: Proposed Treatment Train – Option B

3.4.3 Rainfall Data

Historical rainfall records were obtained from the Bureau of Meteorology for Station No. 66062 at Sydney Observatory Hill. The Evapotranspiration values have been entered from the default data provided by the MUSIC software for the Sydney area.

The following rainfall and runoff parameters have been adopted.

Table 4 - Rainfall Runoff Parameters

Parameter	Recommended Values
Rainfall Threshold (mm/day)	1.4
Soil Storage Capacity (mm)	170
Initial Storage (% of Capacity)	30
Field Capacity (mm)	70
Infiltration Capacity Coefficient – a	210
Infiltration Capacity Exponent – b	4.7
Initial Depth (mm)	10
Daily Recharge Rate (%)	50
Daily Baseflow Rate (%)	4
Daily Deep Seepage Rate (%)	0

The pollutant concentration parameters used in the model were based on information provided in "Using MUSIC in Sydney's Drinking Water Catchment", Sydney Catchment Authority, 2012. The parameters are listed in Table 5:

Table 5 - Water Quality Parameters for MUSIC Source Nodes

Land- Use Category		Log TSS (mg/L)		Log TP (mg/L)		Log TN (mg/L)	
		Storm Flow	Base flow	Storm Flow	Base Flow	Storm Flow	Base Flow
Roof Areas	Mean	1.30	1.20	-0.89	-0.85	0.30	0.11
	Std Dev	0.32	0.17	0.25	0.19	0.19	0.12
Road Areas	Mean	2.43	1.20	-0.30	-0.85	0.34	0.11
	Std Dev	0.32	0.17	0.25	019	0.19	0.12
Other Impervious Areas	Mean	2.15	1.20	-0.60	-0.85	0.30	0.11
	Std Dev	0.32	0.17	0.25	0.19	0.19	0.12
Pervious Areas	Mean	2.15	1.20	-0.60	-0.85	0.30	0.11
	Std Dev	0.32	0.17	0.25	0.19	0.19	0.12

3.4.4 MUSIC Model Results

The results of the analysis show the treatment train will achieve the water quality targets set out in the City of Sydney Council's DCP. The water quality model provides an indication of the pollutant removal rates expected when the nominated treatment train of water quality measures is applied to the proposed development. The results for options A and B are presented in Table 6 and 7 below.

Table 6 - MUSIC Model Results – Option A

Pollutant	Before Treatment	After Treatment	% Reduction	% Objective	Compliance
Gross Pollutants (kg/yr)	13.1	0.17	98.7	90	OK
Total Suspended Solids (kg/yr)	13.7	1.09	92.0	85	OK
Total Phosphorus (kg/yr)	0.0838	0.0359	57.2	65	No
Total Nitrogen (kg/yr)	1.19	0.599	49.7	45	OK

Table 7 - MUSIC Model Results – Option B

Pollutant	Before Treatment	After Treatment	% Reduction	% Objective	Compliance
Gross Pollutants (kg/yr)	13.1	0	100	90	OK
Total Suspended Solids (kg/yr)	13.7	1.69	87.6	85	OK
Total Phosphorus (kg/yr)	0.0838	0.0173	79.4	65	OK
Total Nitrogen (kg/yr)	1.19	0.558	52.9	45	OK

3.5 Stormwater Drainage Network

The stormwater drainage system within the development site will consist of a roof catchment and planter drainage only, and the run-off from the roof catchments will be collected in a series of gutters, planter drainage ,and down pipes and will be delivered to the existing OSD tank in the Carpark Building to the west of the Wilkinson Building. All drainage from the building is required to be collected and discharged to the OSD. From here it will discharge to an existing stormwater drainage system that runs along St. Peter's Street as shown in Figure 6. For further details, refer to the 'Masterplan Stormwater and Flood Report. prepared by TTW in Appendix A.

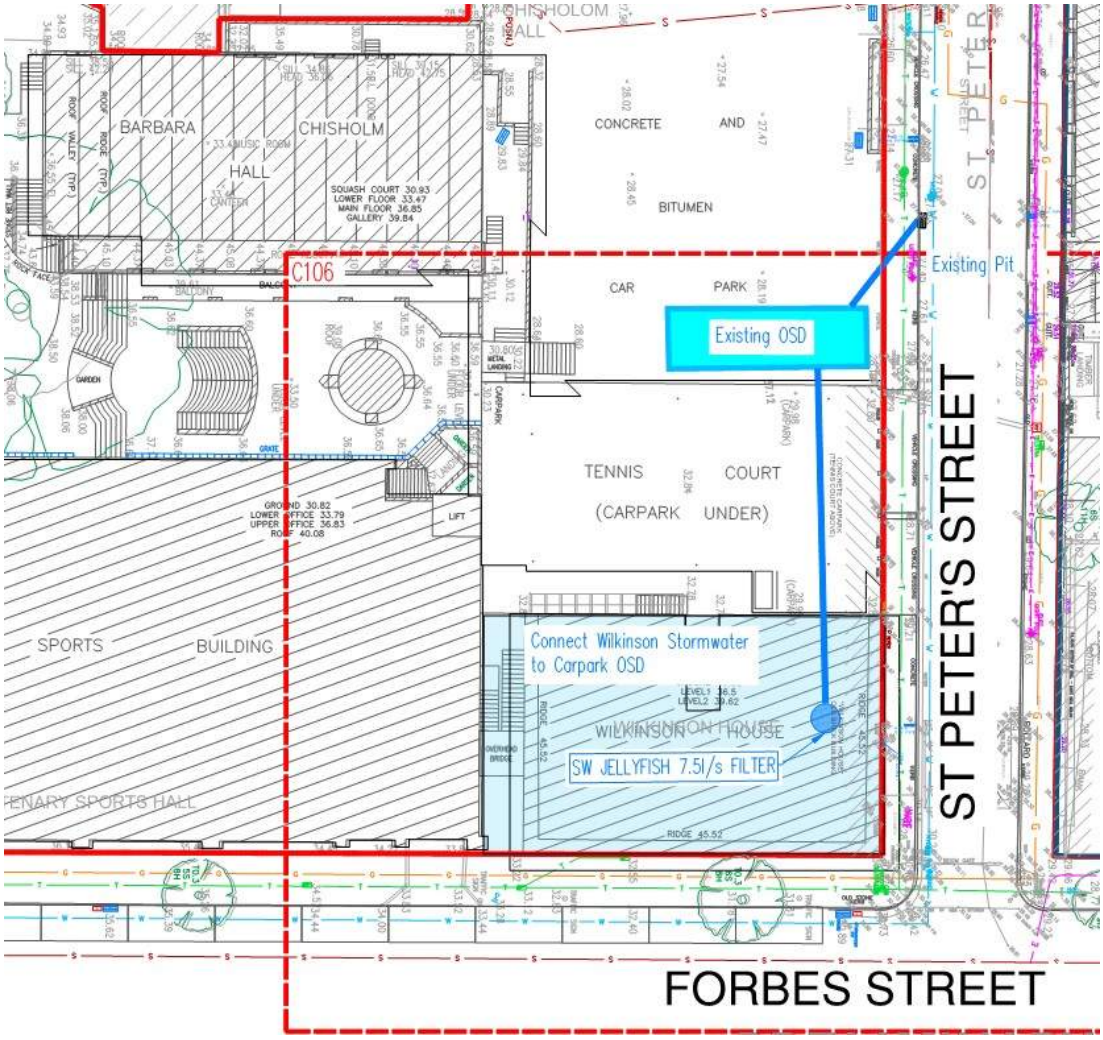

Figure 6: Connection to existing OSD and stormwater infrastructure

4. Acid Sulfate Soils

4.1 Desktop Review

Following a desktop review of the Acid Sulfate Soil conditions, the works will not impact Acid Sulfate Soils as the site falls within a class 5 location as shown in Figure 7 below.

Figure 7: City of Sydney Acid Sulfate Soil Classification Map

Further assessment of the acid sulfate soil condition is required in order to prepare a management plan, and can be undertaken by a suitably qualified geotechnical engineer.

5. Sediment and Erosion Control

The objectives of the erosion and sediment control for the development site are to ensure:

- Adequate erosion and sediment control measures are applied prior to the commencement of construction and are maintained throughout construction; and
- Construction site runoff is appropriately treated in accordance with City of Sydney requirements.

As part of the works, the erosion and sedimentation control will be constructed in accordance with Council requirements and the NSW Department of Housing Manual, “Managing Urban Stormwater Soil & Construction” 2004 (Blue Book) prior to any earthworks commencing on site. The Concept Sediment and erosion control measures are documented in Northrop’s Development Application drawing DAC01.11 – DAC02.11.

5.1 Sediment and Erosion Control Measures

Prior to any earthworks commencing on site, sediment and erosion control measure shall be implemented generally in accordance with the Construction Certificate drawings and the “Blue Book”. The measures shown on the drawings are intended to be a minimum treatment only as the contractor will be required to modify and stage the erosion and sedimentation control measures to suit the construction program, sequencing and techniques. These measures will include:

- A temporary site security/safety fence is to be constructed around the site
- Sediment fencing provided downstream of disturbed areas, including any topsoil stockpiles;
- Dust control measures including covering stockpiles, installing fence hessian and watering exposed areas;
- Placement of mesh and gravel inlet filters around and along proposed catch drains and around stormwater inlets pits; and
- Stabilised site access at the construction vehicle entry/exits.

Any stockpiled material, including topsoil, shall be located as far away as possible from any associated natural watercourses or temporary overland flow paths. Sediment fences shall be installed to the downstream side of stockpiles and any embankment formation. All stockpiles and embankment formations shall be stabilised by hydroseeding or hydromulching on formation.

Appendix A – Master Stormwater and Flood Report

Prepared by Taylor Thomas Whittling (August 2018)

MASTERPLAN STORMWATER AND FLOOD REPORT

SCEGGS DARLINGHUSRST

Prepared for SCEGGS DARLINGHURST / 24 / 08 / 2018

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Structural
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Contents

1.0 Introduction

1.1 The Site

The proposed site is the SCEGGS Darlinghurst. Its address is 215 Forbes Street, Darlinghurst. Figure 1 shows the area and locality of the site. The total combined area is 13,740m^2.

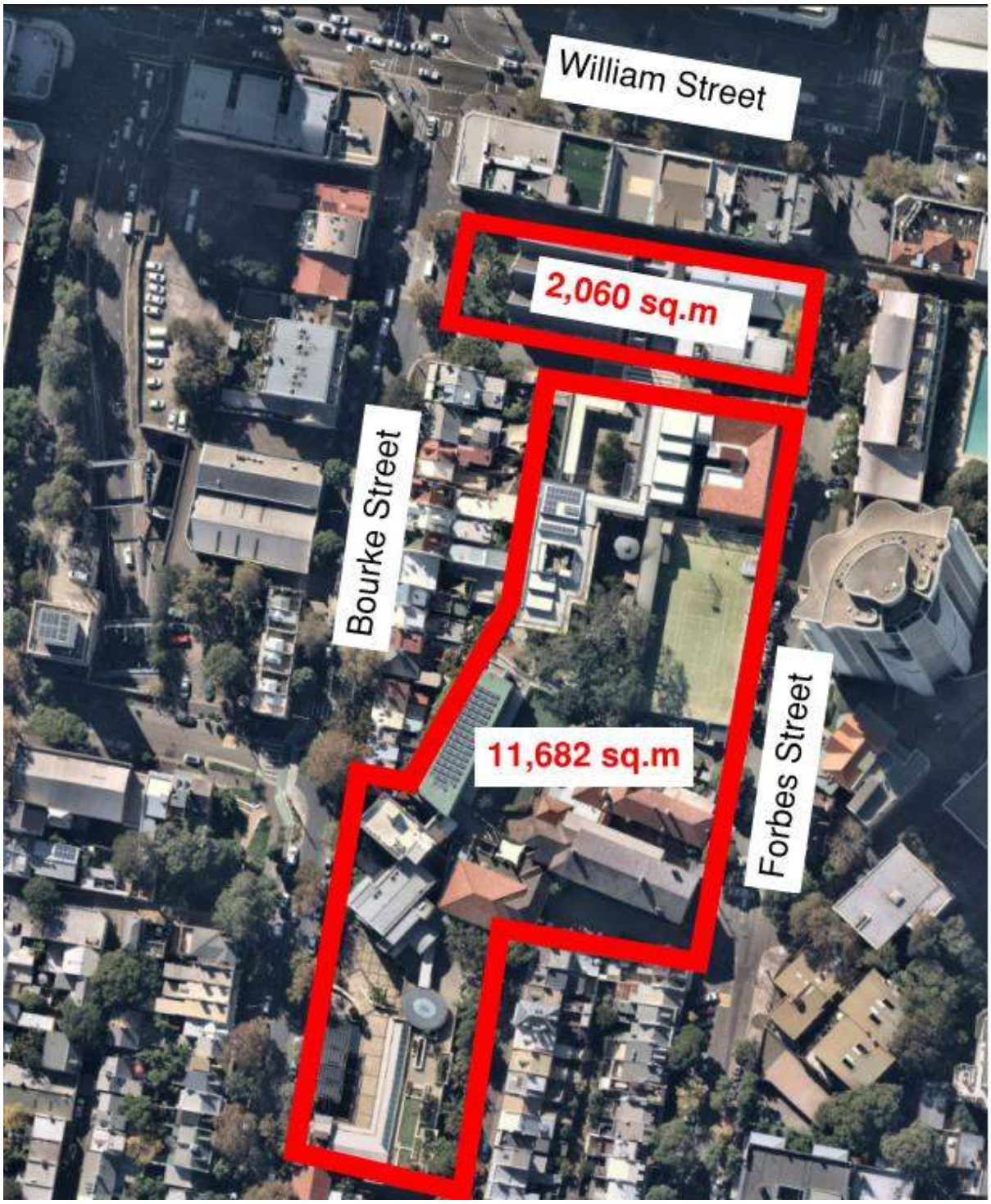

Figure 1: SCEGGS Darlinghurst.

1.2 Relevant Documents

- SCEGGS Darlinghurst Masterplan, TKD Architects (July 2018)
- SCEGGS Darlinghurst 2040 Masterplan, TKD Architects (May 2018)
- Sydney DCP 2012
- Flood Map
- 5th of June 2018 Sydney Water Letter (lulu.huang@sydney.com.au)
- DBYD
- DECCW (OEH 2013)
- Stormwater concept
- Erosion and sediment control plan

2.0 Proposed Masterplan Development

The Proposed masterplan consists of 3 separate stages of works. Figure 2 shows the overall masterplan with proposed works in shown in colour.

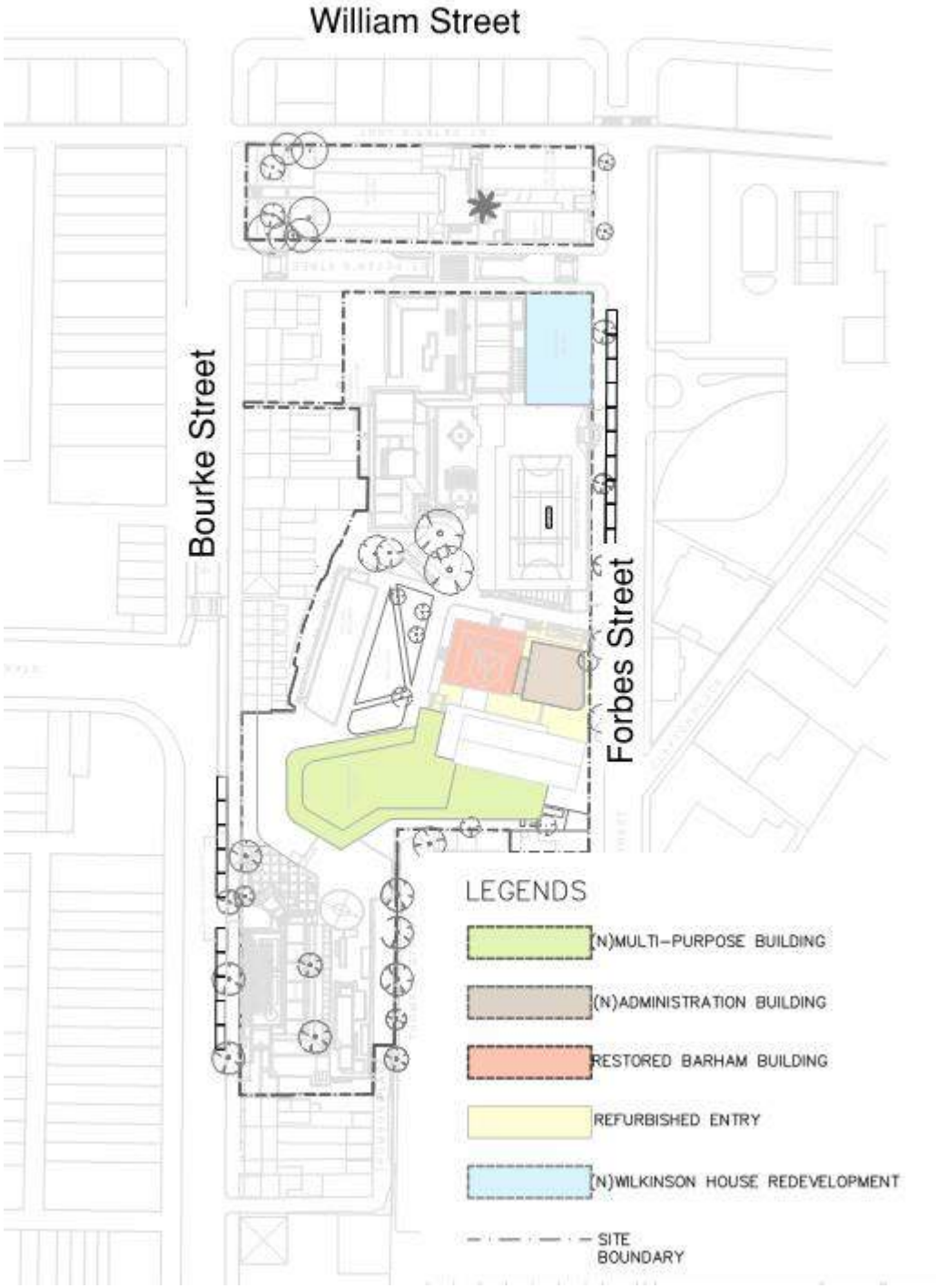

Figure 2: Masterplan Development (TKD Architects, July 2018)

2.1 Stage 1 – Wilkinson Building

The existing Wilkinson building will be demolished to make way for a new Wilkinson Building with a larger footprint and more efficient use of space. The new Wilkinson Building will have a footprint of 455m^2 as opposed to the old Wilkinson building's 400m^2. Stage 1 will attempt to gain 4 Green Stars for ecological sustainable design.

Figure 2: New Wilkinson Building Footprint (TKD Architects)

2.2 Stage 2 – New Multi-Purpose Building

The existing Science Building, Library Building and Gym Building will be demolished to make way for the New Multi-Purpose Building. The extent of the proposed works is shown in Figure 3. The New Multi-Purpose Building will be 7 stories high and include basement parking with ingress and egress from Bourke Street. Some of the levels will be terraced and allow pedestrian movement to other areas of the site.

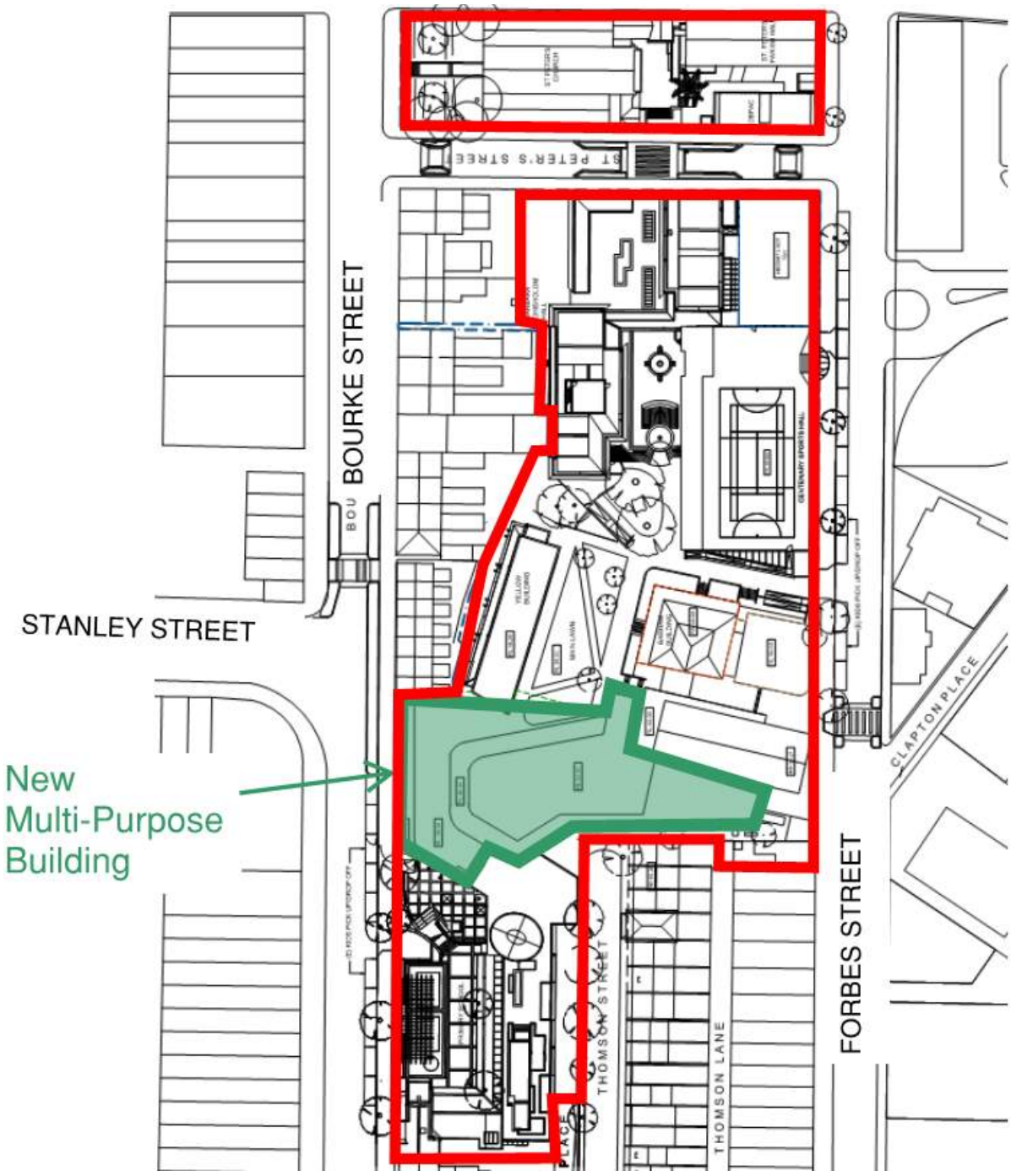

Figure 3: New Multi-Purpose Building (SCEGGS Darlinghurst 2040 Masterplan, 2018)

2.3 Stage 3 – Administration Building and Barham

The New administration Building will be 4 levels. The Barham building will be restored and refurbished with consideration to the heritage aspects of the building. Figure 4 shows the location of the Buildings.

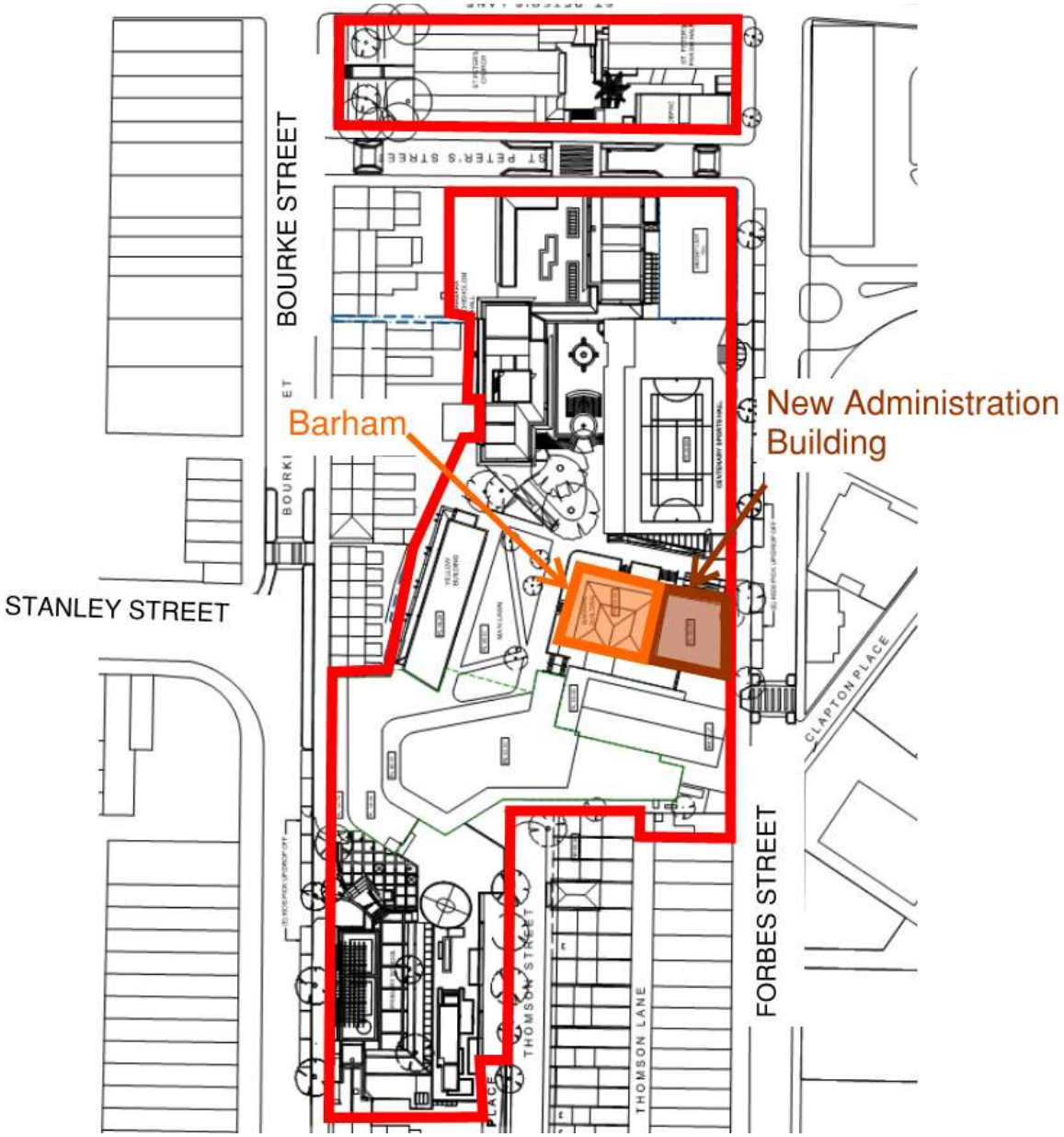

Figure 4: Barham and Administration Buildings (SCEGGS Darlinghurst 2040 Masterplan, 2018)

3.0 Stormwater Management

The Sydney DCP requires a local drainage management plan for the proposed site because it is larger than 1,800m^2. The Local drainage management plan is to address the hydrology of the locality, distribution of soil types, expected rise in ground water level, water conservation and on-site detention, water quality, pedestrian safety and the integration of drainage management responses and open space areas.

3.1 On Site Detention

Section 3.7 of the DCP states that stormwater volumes during an average rainfall year are to be the lesser of:

1.) 70% of the volume if no measures were applied to reduce stormwater volume.
2.) Equivalent to the volume generated if the site were 50% pervious.

The Wilkinson Building is isolated from the other stages of works and it is not feasible to connect the discharge from the Wilkinson building to the same OSD tank as the future stages of work. A DRAINS model was set up for the Stage 1 works and Table 1 shows that the Wilkinson Building will require an OSD tank that is 6m^3 in volume and has an orifice of 225mm in order to meet DCP requirements for site discharge.

Table 1: Permissible and Proposed Discharge for Wilkinson Building

	PSD	Proposed Site
1-year ARI	9.1 l/s	9 l/s
100-year ARI	23 l/s	19 l/s

This is a relatively small volume and it is possible to connect the discharge of the Wilkinson Building to the existing OSD tank for the Car Park to the West. The existing OSD tank was designed by HughesTrueman in 2008 and the Stormwater DA Report is in Appendix A. The data for the size of the OSD tank and it's contributing catchment was used to produce a new DRAINS model which includes the catchment from the Wilkinson Building and the layout is in Appendix B. The current design of the OSD tank does not have sufficient capacity to accommodate the discharge from the Wilkinson Building and the OSD tank will overflow. The current orifice plate is 98mm in diameter and this needs to increase in diameter for the existing OSD tank to have sufficient capacity. Table 2 shows the permissible as well as proposed site discharge of the combined Carpark building and the Wilkinson Building with an enlarged orifice.

Table 2: Permissible and Proposed Discharge for combined Carpark and Wilkinson Buildings

	PSD	Proposed Site
1-year ARI	31 l/s	22 l/s
100-year ARI	79 l/s	49 l/s

Further information regarding the as-built dimensions of the OSD tank and size of the pipe connecting the OSD tank to the street drainage is required.

Stage 2 and 3 will discharge to the same OSD tank. A DRAINS model was set up to calculate the dimensions required of the OSD tank to meet the DCP specifications. The layout for this DRAINS model is in Appendix D. The OSD tank is required to be 70m^3 with an orifice of 260mm. Table 3 compares the permissible site discharge to the proposed site discharge.

Table 3: Permissible and Proposed Site Discharge for combined Stages 2 & 3

	PSD	Proposed Site
1-year ARI	66.5 l/s	65 l/s
100-year ARI	247 l/s	141 l/s

3.2 Water Quality

The proposed site is required to meet City of Sydney's water quality targets as set out in section 3.7.3 of the Sydney DCP 2012. It is proposed to treat the stormwater from the Stage 1 works at the Wilkinson Building separately to the Stage 2 & 3 works. MUSIC was used to model the proposed works and estimate the pollutant reductions that result from the proposed treatment trains. A MUSIC template was created that uses the rainfall data from Sydney Airport, the potential evaporation-transpiration data for Sydney and a 6 minute time interval.

The proposed treatment train for the new Wilkinson Building consists of a proprietary filter and the existing OSD tank in the Carpark Building. Stormwater will be collected from the roof of the Wilkinson Building and be treated by a Stormwater360 Jellyfish 7.5 L/s filter (or equivalent) before entering the detention tank and then discharging to the street drainage on St Peter's Street. Table 4 compares the water quality target pollutant reductions as set out in the DCP to the expected pollution reductions from the proposed treatment train.

Table 4: Water Quality

Pollutant	Target (% reduction)	Proposed Site (% reduction)
Gross Pollutants	90	98
Total Suspended Solids	85	87
Total Phosphorous	65	70
Total Nitrogen	45	48

The proposed treatment train for stages 2 & 3 of the Masterplan consists of 2 Stormwater360 Enviropod gross pollutant traps to be fitted to stormwater pits, a Stormwater360 Jellyfish 12.5 L/s filter and an OSD tank. Table 5 compares the water quality

targets set out in the DCP to the expected pollutant reductions achieved by the proposed treatment train.

Table 4: Water Quality

Pollutant	Target (% reduction)	Proposed Site (% reduction)
Gross Pollutants	90	99
Total Suspended Solids	85	88
Total Phosphorous	65	68
Total Nitrogen	45	57

3.3 Rainwater Tanks

City of Sydney Council do not mandate rainwater tanks.

If rainwater tanks are to be incorporated in the design, then appropriate measures must be taken to ensure the captured stormwater is cleaned to exclude contaminants such as litter, sediment and oil.

3.4 Green Star

The client has expressed interest in Ecologically Sensitive Design (ESD) and wish to achieve a 4-star Green Star Rating. Stormwater management can gain up to 4 points.

1 point is available where post-development peak discharge does not exceed pre-development peak discharge. The proposed development will not be increasing the area of impervious surfaces and so this point should be easily achieved.

Additional points are available for stormwater pollution control only if the peak discharge point is achieved. Table 2 sets out these points. 2 points are awarded if column B is achieved, 3 are awarded if column C is achieved.

Table 2: Green Star pollution reduction targets

Green Star – Design & As Built v1.2 26 Stormwater

Table 26.2 Pollution Reduction Targets

Pollutant	Reduction Target (% of the typical urban annual load)		
	A	B	C
Total Suspended Solids (TSS)[1]	80%	80%	90%
Gross Pollutants	85%	90%	95%
Total Nitrogen (TN)[2]	30%	45%	60%
Total Phosphorus (TP)[2]	30%	60%	70%
Total Petroleum Hydrocarbons[3]	60%	90%	90%
Free Oils[3]	90%	90%	98%

Notes:

1 Load based on the following particulate size distribution (by mass): 20% <20 µm; 20% 20-60 µm; 20% 60-150 µm; 20% 150-400 µm; 20% 400-2000 µm.

2 Load includes particulate and dissolved fraction.

3 This requirement is not applicable where the site contains less than a total of 200m^2 of uncovered areas where vehicles are likely to transit and/or park e.g. roads, loading docks, refuelling bays, car parking etc.

The targets for petroleum and oils are not applicable to the proposed development because there will be less than 200m^2 of uncovered areas where vehicles are likely to transit or park.

3.5 Connection to Street Drainage

The stormwater collected from the Wilkinson Building will flow to the existing OSD tank in the Carpark Building to the west of the Wilkinson Building. From here it will discharge to an existing stormwater drainage system that runs along St. Peter's Street.

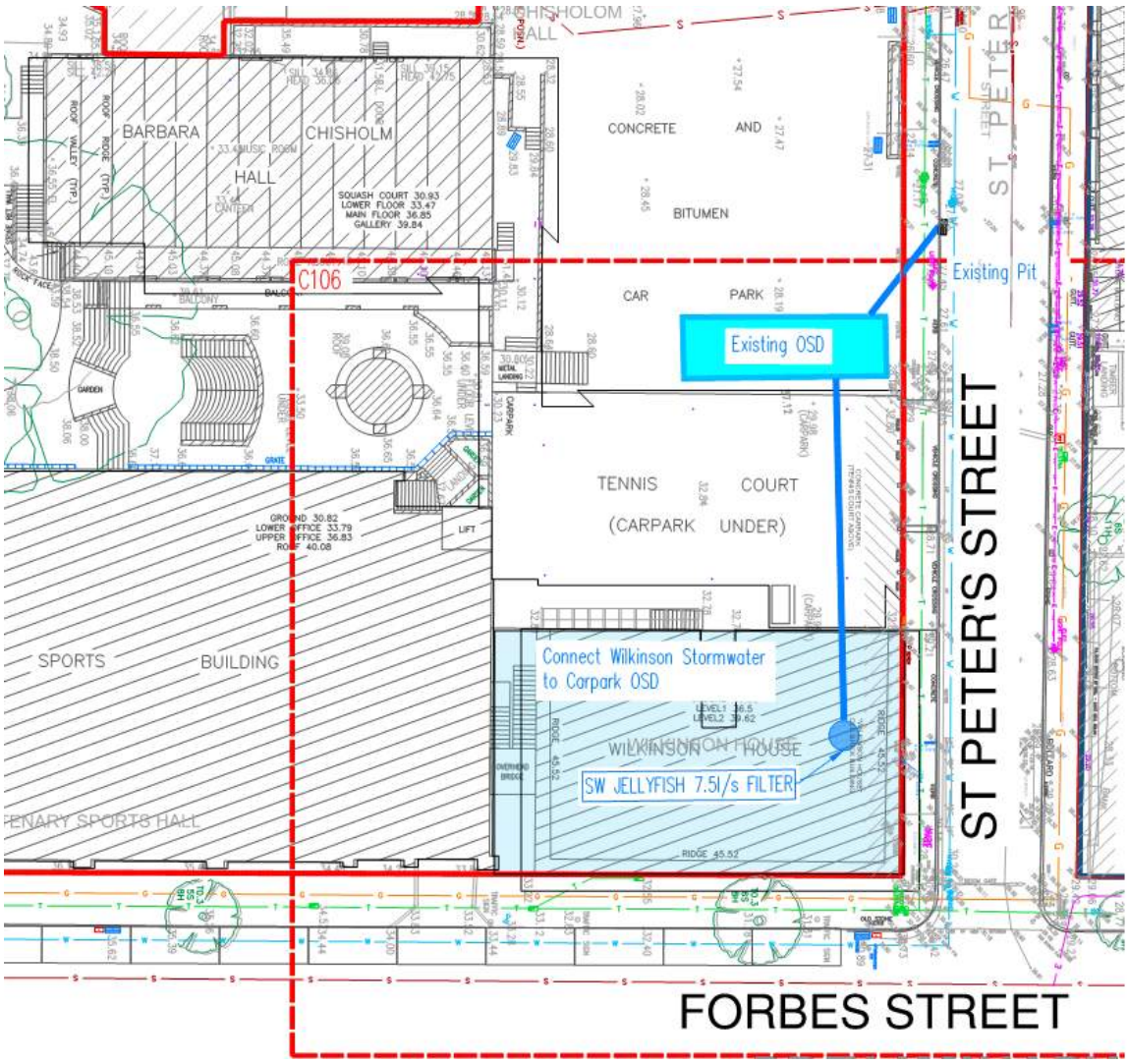

Figure 5: Connection to existing pit on St Peter's Street

The stormwater collected from the Stage 2 and Stage 2 works will flow to a new OSD tank before discharging to an existing kerb inlet pit on Bourke Street.

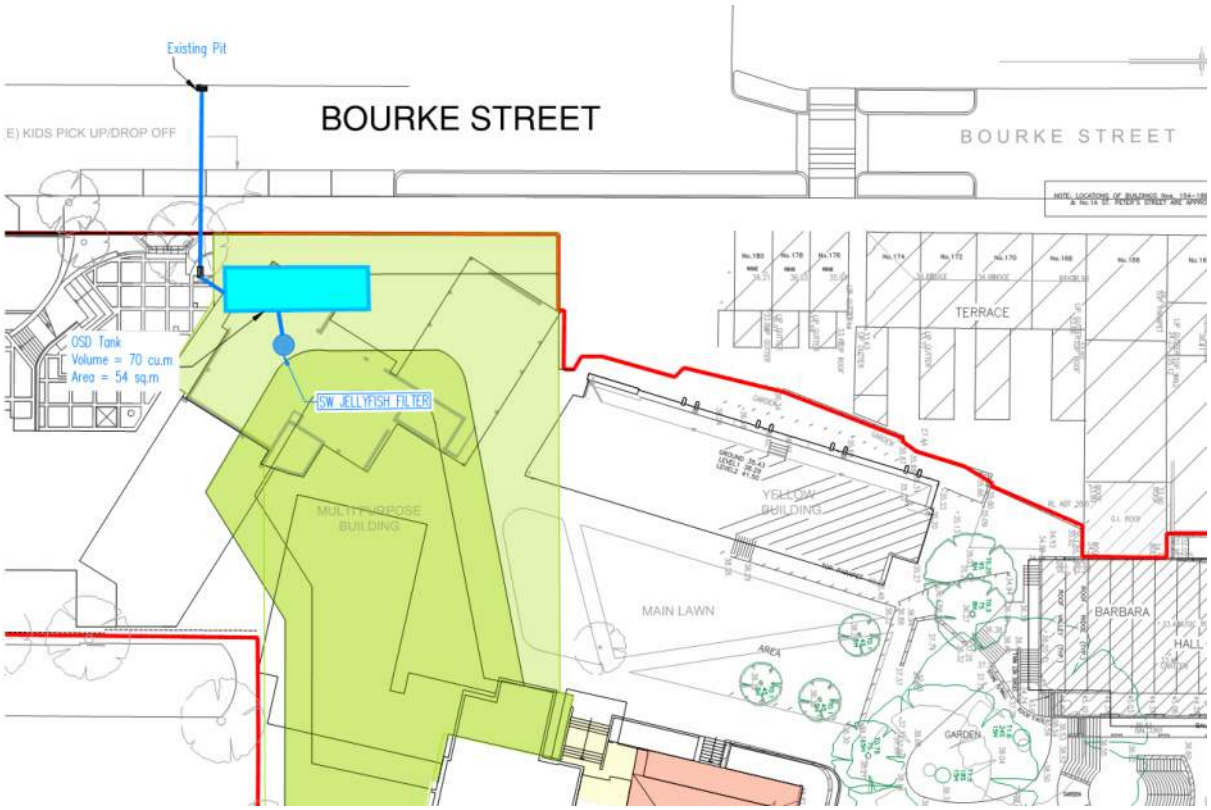

Figure 6: Connection to existing pit on Bourke Street

Detailed survey is required to determine the size and invert level of the existing stormwater network along Bourke Street.

4.0 Flood Management

The proposed site is located within the Woolloomooloo floodplain and is towards the top of the catchment with only minor levels of flooding during the 100-year ARI flood event. WMA water prepared a Woolloomooloo Flood Study for City of Sydney Council in 2016. Figure 8 is an extract from Figure 18 in the Woolloomooloo Catchment Flood Study and shows the extent of flooding around the proposed site during the 100-year ARI.

Figure 8: Peak depth of the 100-year ARI flood event (WMA water, 2016)

4.1 Flood Planning Levels

Clause 7.15 of the Sydney Local Environment Plan defines the Flood Planning Level as "the level of a 1:100 ARI flood event plus 0.5m freeboard." The extent of the proposed site is too large for a single Flood Planning Level to be relevant to all buildings. The Flood Planning Level for each of the proposed buildings has been taken as the 100-year flood level at the closest point that floodwaters may enter the site plus 0.5 metres.

There is a minor amount of flooding on Forbes Street. In front of the Wilkinson building there appears to be less than 100mm of ponding according to the 100-year ARI flood event map. This amount of flooding will be contained within the kerb and gutter system on the west side of Forbes Street. The flood planning level for the Wilkinson Building is taken as the invert of the kerb on Forbes Street plus 0.5m. The invert level of the kerb in front of the current Forbes Street entrance to the Wilkinson House Building is approximately 31.78m AHD. This

gives a Flood Planning Level of RL32.38m AHD for this entrance of the Wilkinson Building. The ground floor of the Wilkinson Building has a finished floor level of RL33.5m AHD.

The flooding on Bourke Street in front of the proposed site during the 100-year ARI flood appears to be less than 100mm according to the 100-year ARI flood event map. This flooding will be contained within the kerb and gutter system of Bourke Street. Accordingly, the Flood Planning Level for the proposed site along Bourke Street is a maximum of 100mm above the invert of the kerb plus 500mm freeboard. The driveway from Bourke Street into the proposed basement carpark is required to have a crest above the Flood Planning Level. The invert level of the kerb in front of the proposed exit driveway is approximately RL28.15m AHD. This gives a Flood Planning Level of RL28.75m AHD for the crest of the exit driveway. The invert level of the kerb in front of the proposed entry driveway is approximately RL27.92m AHD. This gives a Flood Planning Level of RL28.52m AHD for the crest of the entry driveway.

The 100-year ARI flood event map shows flood depths on the northern end of Thomas Street pond up to 1m in depth. It is likely that the floodwaters will flow through the permeable fence and over the retaining wall that bounds the SCEGGS. The flood water will flow through the school property and onto Bourke Street.

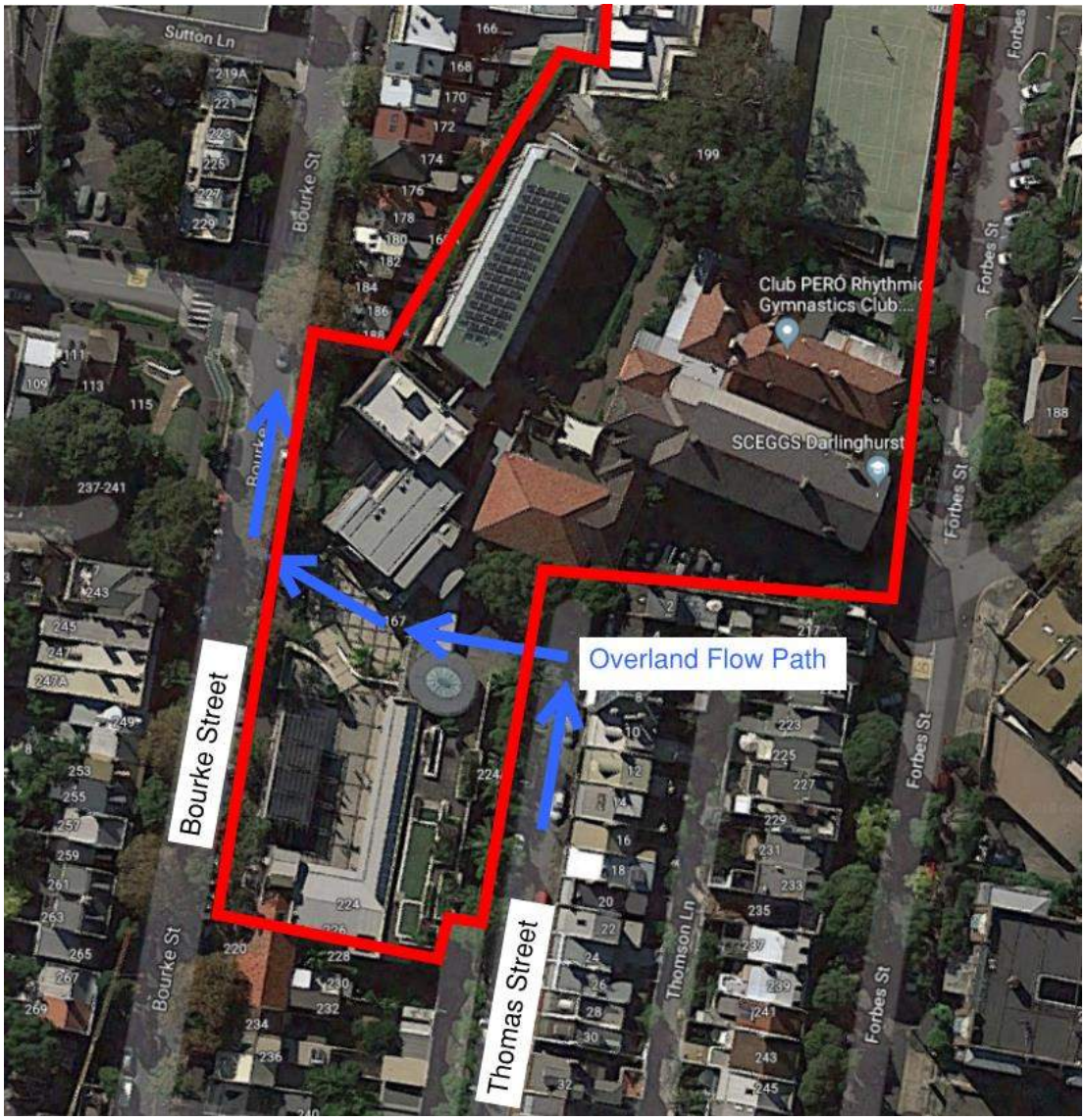

Figure 9: Overland Flow Path from Thomas Street to Bourke Street.

5.0 Conclusion

The SCEGGS Darlinghurst Masterplan will be undertaken in 3 stages. Stage 1 is the knockdown-rebuild of Wilkinson House. Stage 2 is the demolition of the Library, Science and Gym buildings to make room for the new Multi-Purpose Building. Stage 3 includes the restoration of the heritage Barham Building and construction of the new Administration Building.

The stormwater management of Stage 1 will be separate to Stages 2 and 3. The stormwater collected from the Stage 1 works will be treated by a Stormwater360 Jellyfish filter or equivalent and then flow to the existing OSD tank in the Carpark Building before discharging to St Peter's Street. The orifice plate in the existing OSD tank needs to be replaced with an orifice of larger diameter. The existing OSD tank with the new orifice plate will reduce site discharge sufficiently to comply with Council's permissible site discharge as set out in the Sydney 2012 DCP.

The stormwater from stages 2 and 3 will be treated by Stormwater360 Enviropods to be fitted in grated inlet pits and a Stormwater360 Jellyfish filter or equivalent before flowing to the proposed OSD tank adjacent to Bourke Street. The new OSD tank is proposed to be 70m^3 and requires an orifice diameter of 260mm to comply with the Council's permissible site discharge rates.

The Flood Planning Level of the site varies. The site has been designed so that entry points to the proposed buildings are above the 100-year flood levels plus a freeboard of 0.5m. An overland flow path has been allowed for at the northern end of Thomas Street. This flow path transverses the SCEGGS site from Thomas Street to Bourke Street.

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Technical Director

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Appendix B – City of Sydney Flood Study Results

Woolloomooloo Catchment Flood Study – April 2016


FIGURE 12
HISTORIC CALIBRATION
12 FEBRUARY 2012
COWPER
SIR JOHN YOUNG CRESCENT
CATHEDRAL STREET
CROWN STREET
FORBES STREET
DOWLING STREET
VICTORIA STREET
UGHAM STREET
WILLIAM STREET
PALMER STREET
4.2
3.9
30.5
30.5
N
3.9 Observed Level (mAHD)
4.3 Modelled Level (mAHD)
Points of Interest
Major Contour (5m Interval)
Minor Contour (1m Interval)
Hydraulic Model Domain
Peak Flood Depth (m)
< 0.1
0.1 - 0.2
0.2 - 0.5
0.5 - 1.0
1.0 - 2.0
> 2.0
0
50
100
200
300
400
m
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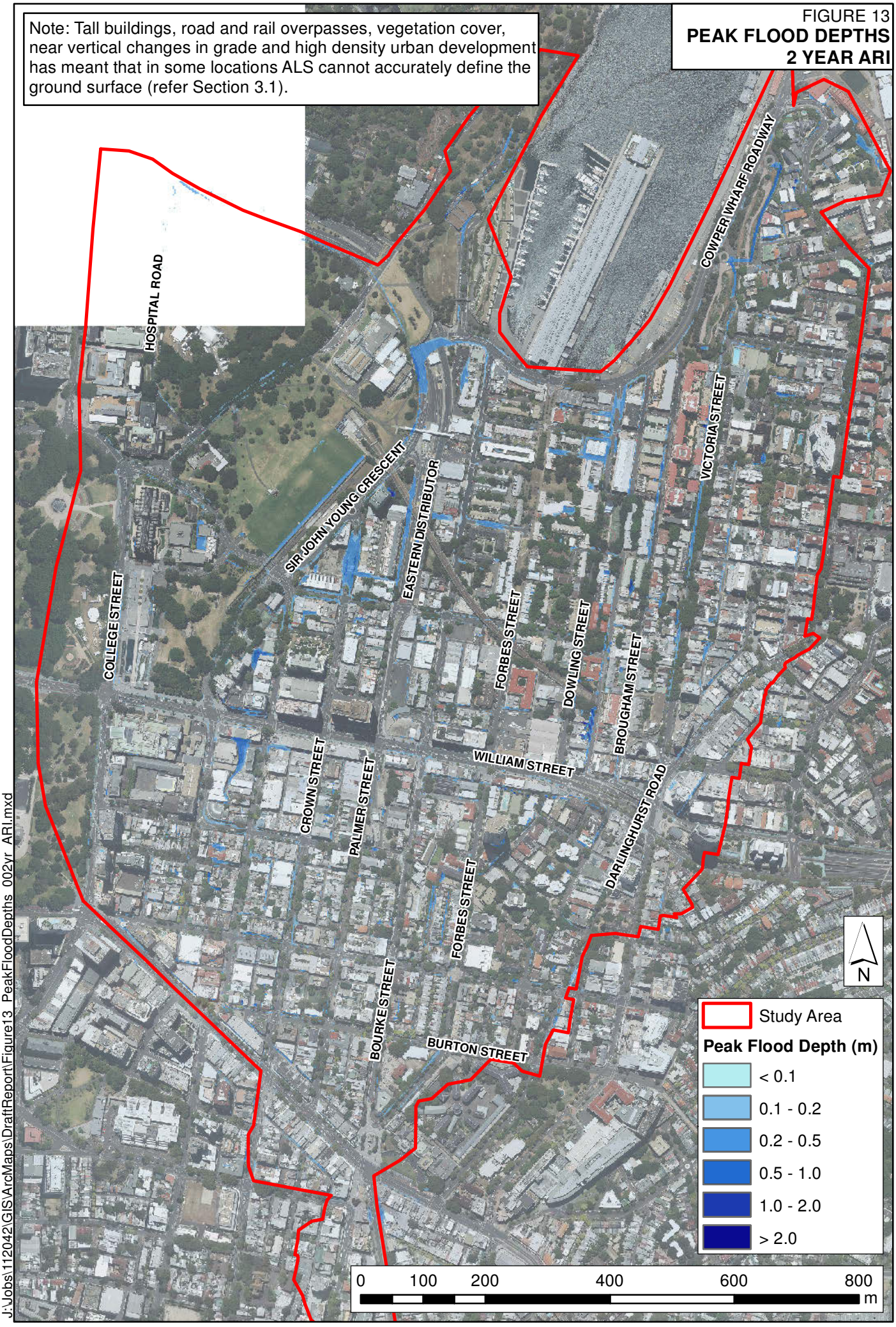
FIGURE 13
PEAK FLOOD DEPTHS
2 YEAR ARI

Note: Tall buildings, road and rail overpasses, vegetation cover, near vertical changes in grade and high density urban development has meant that in some locations ALS cannot accurately define the ground surface (refer Section 3.1).



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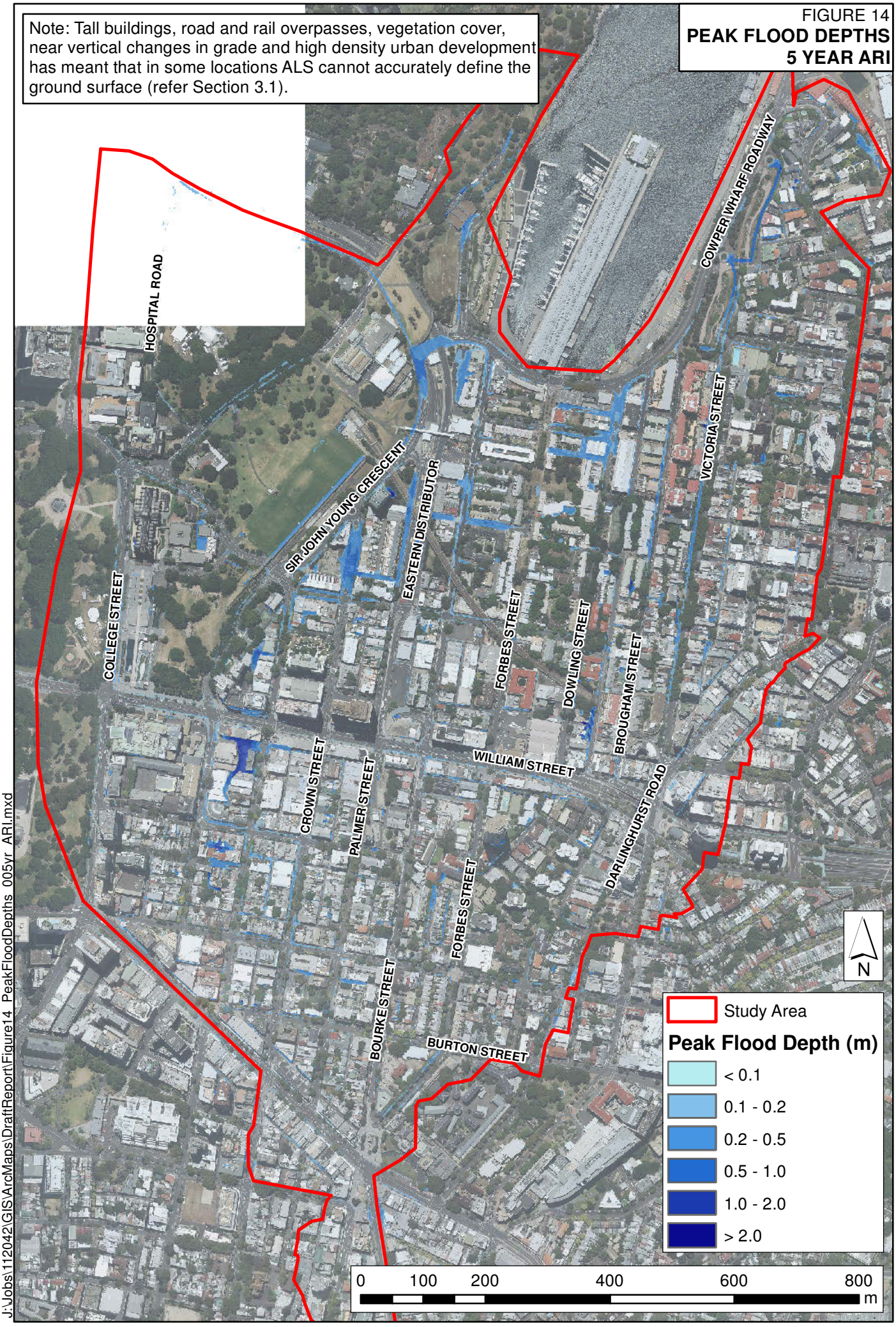
FIGURE 14
PEAK FLOOD DEPTHS
5 YEAR ARI
Note: Tall buildings, road and rail overpasses, vegetation cover, near vertical changes in grade and high density urban development has meant that in some locations ALS cannot accurately define the ground surface (refer Section 3.1).
HOSPITAL ROAD
COWPER WHARF ROADWAY
VICTORIA STREET
SIR JOHN YOUNG CRESCENT
EASTERN DISTRIBUTOR
COLLEGE STREET
FORBES STREET
DOWLING STREET
BROUGHAM STREET
WILLIAM STREET
CROWN STREET
PALMER STREET
DARLINGHURST ROAD
FORBES STREET
BOURKE STREET
BURTON STREET
N
Study Area
Peak Flood Depth (m)
< 0.1
0.1 - 0.2
0.2 - 0.5
0.5 - 1.0
1.0 - 2.0
> 2.0
0
100
200
400
600
800
m
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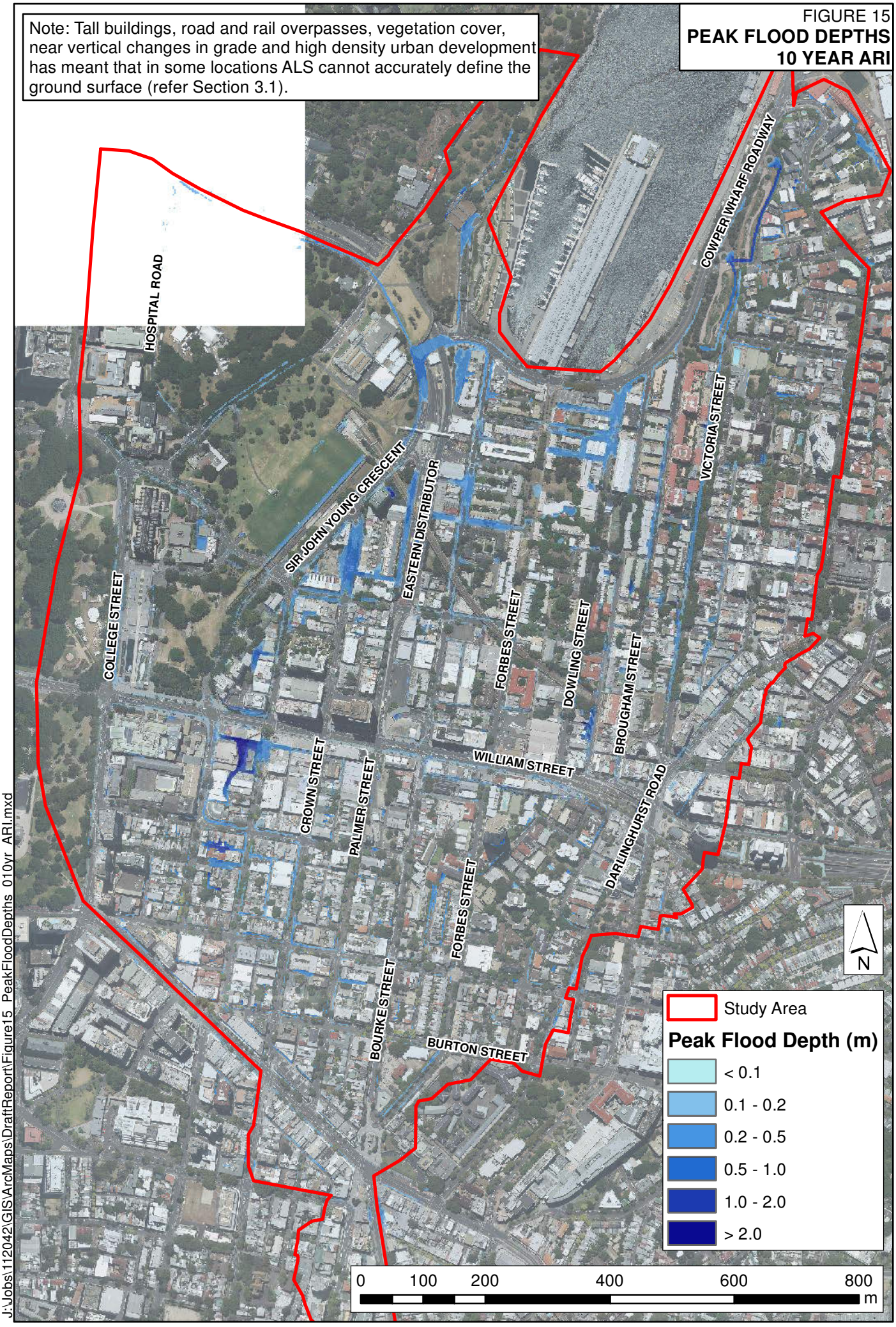
FIGURE 15
PEAK FLOOD DEPTHS
10 YEAR ARI
Note: Tall buildings, road and rail overpasses, vegetation cover, near vertical changes in grade and high density urban development has meant that in some locations ALS cannot accurately define the ground surface (refer Section 3.1).
HOSPITAL ROAD
COWPER WHARF ROADWAY
VICTORIA STREET
SIR JOHN YOUNG CRESCENT
EASTERN DISTRIBUTOR
COLLEGE STREET
FORBES STREET
DOWLING STREET
BROUGHAM STREET
WILLIAM STREET
CROWN STREET
PALMER STREET
DARLINGHURST ROAD
FORBES STREET
BOURKE STREET
BURTON STREET
N
Study Area
Peak Flood Depth (m)
< 0.1
0.1 - 0.2
0.2 - 0.5
0.5 - 1.0
1.0 - 2.0
> 2.0
0
100
200
400
600
800
m
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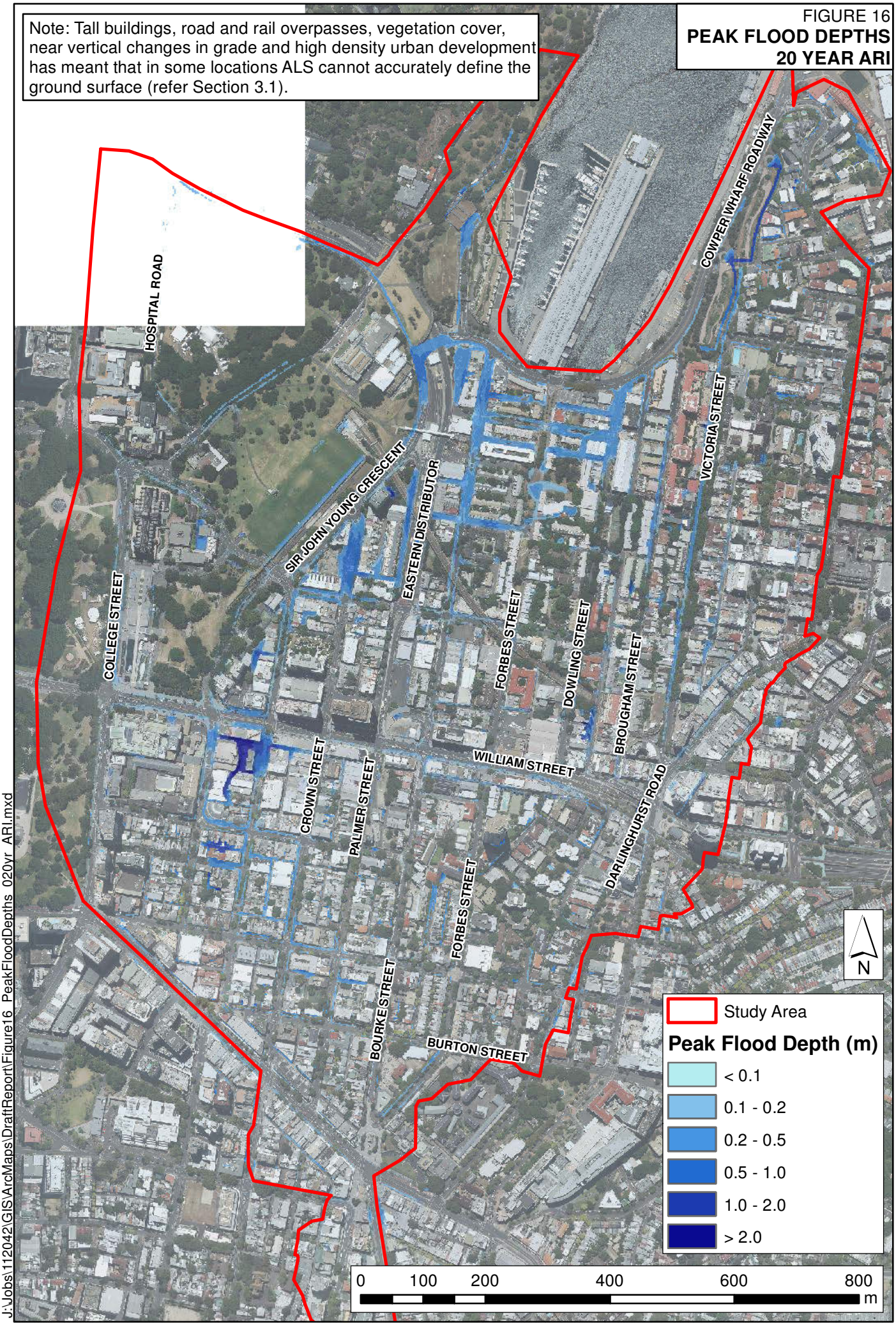
FIGURE 16
PEAK FLOOD DEPTHS
20 YEAR ARI
Note: Tall buildings, road and rail overpasses, vegetation cover, near vertical changes in grade and high density urban development has meant that in some locations ALS cannot accurately define the ground surface (refer Section 3.1).
HOSPITAL ROAD
COWPER WHARF ROADWAY
VICTORIA STREET
SIR JOHN YOUNG CRESCENT
EASTERN DISTRIBUTOR
COLLEGE STREET
FORBES STREET
DOWLING STREET
BROUGHAM STREET
WILLIAM STREET
CROWN STREET
PALMER STREET
DARLINGHURST ROAD
FORBES STREET
BOURKE STREET
BURTON STREET
N
Study Area
Peak Flood Depth (m)
< 0.1
0.1 - 0.2
0.2 - 0.5
0.5 - 1.0
1.0 - 2.0
> 2.0
0
100
200
400
600
800
m
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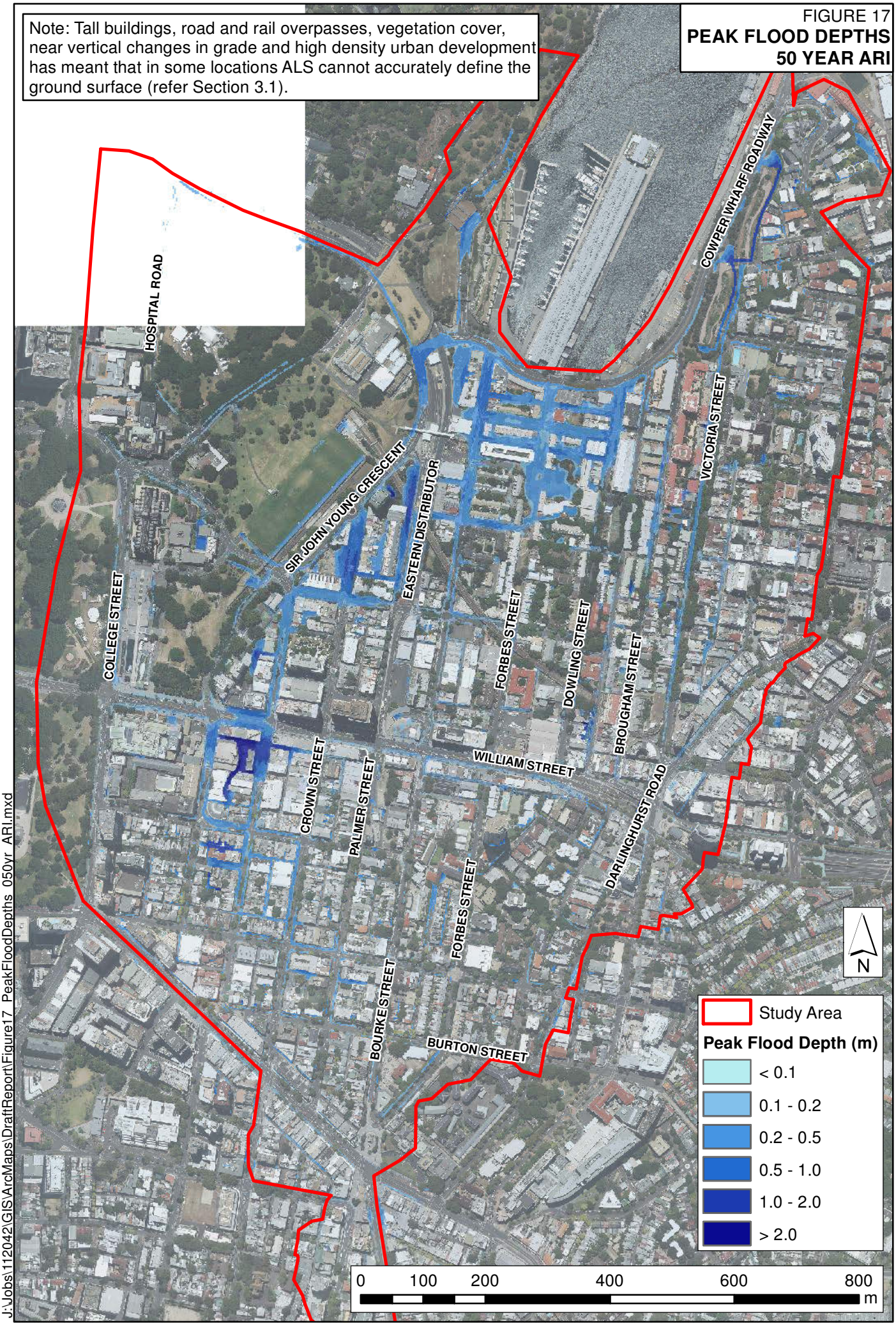
FIGURE 17

PEAK FLOOD DEPTHS
50 YEAR ARI

Note: Tall buildings, road and rail overpasses, vegetation cover, near vertical changes in grade and high density urban development has meant that in some locations ALS cannot accurately define the ground surface (refer Section 3.1).



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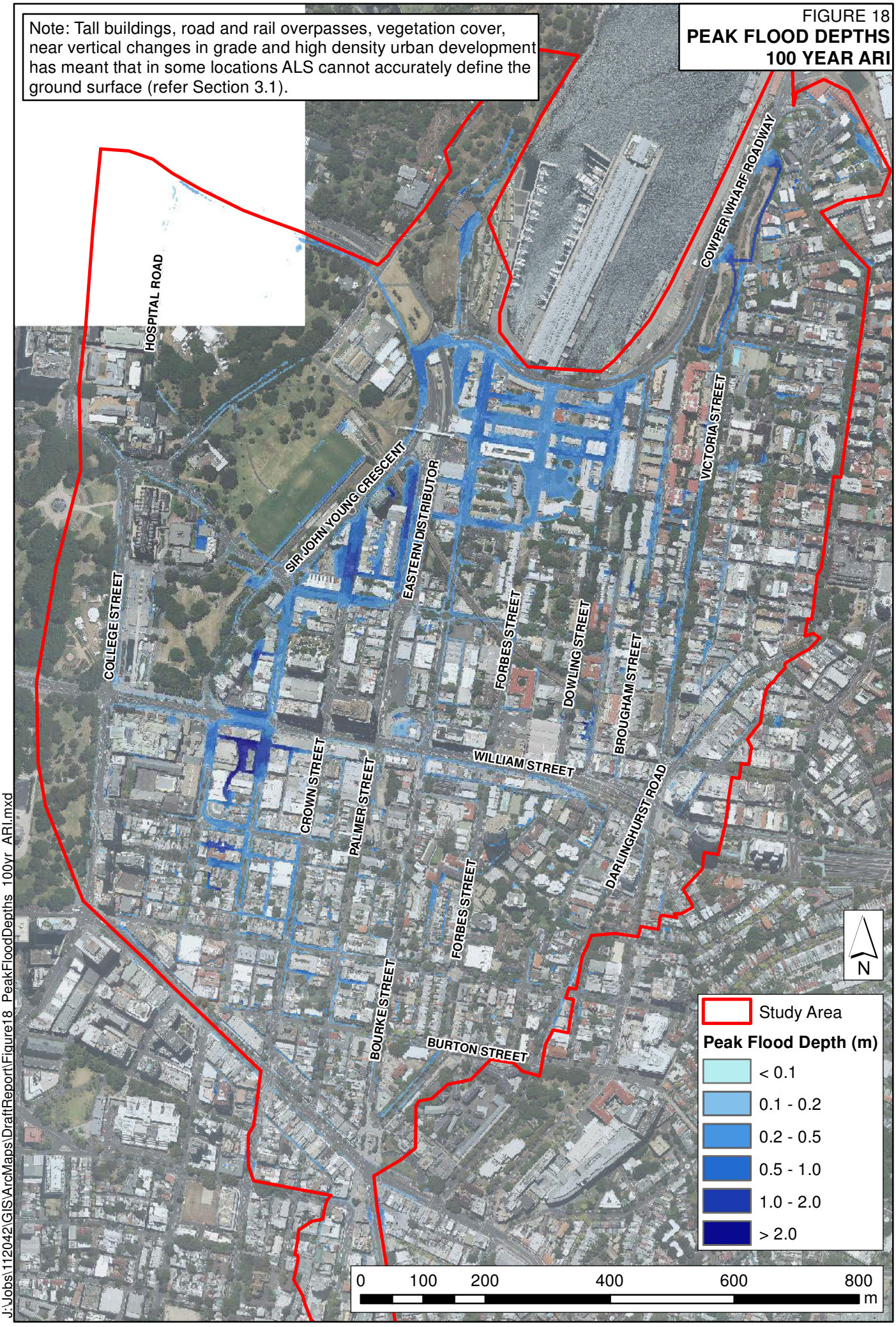
Note: Tall buildings, road and rail overpasses, vegetation cover, near vertical changes in grade and high density urban development has meant that in some locations ALS cannot accurately define the ground surface (refer Section 3.1).
FIGURE 18
PEAK FLOOD DEPTHS
100 YEAR ARI
HOSPITAL ROAD
COWPER WHARF ROADWAY
VICTORIA STREET
SIR JOHN YOUNG CRESCENT
EASTERN DISTRIBUTOR
COLLEGE STREET
FORBES STREET
DOWLING STREET
BROUGHAM STREET
WILLIAM STREET
CROWN STREET
PALMER STREET
DARLINGHURST ROAD
FORBES STREET
BOURKE STREET
BURTON STREET
N
Study Area
Peak Flood Depth (m)
< 0.1
0.1 - 0.2
0.2 - 0.5
0.5 - 1.0
1.0 - 2.0
> 2.0
0
100
200
400
600
800
m
J:\Jobs\112042\GIS\ArcMaps\DraftReport\Figure18_PeakFloodDepths_100yr_ARI.mxd

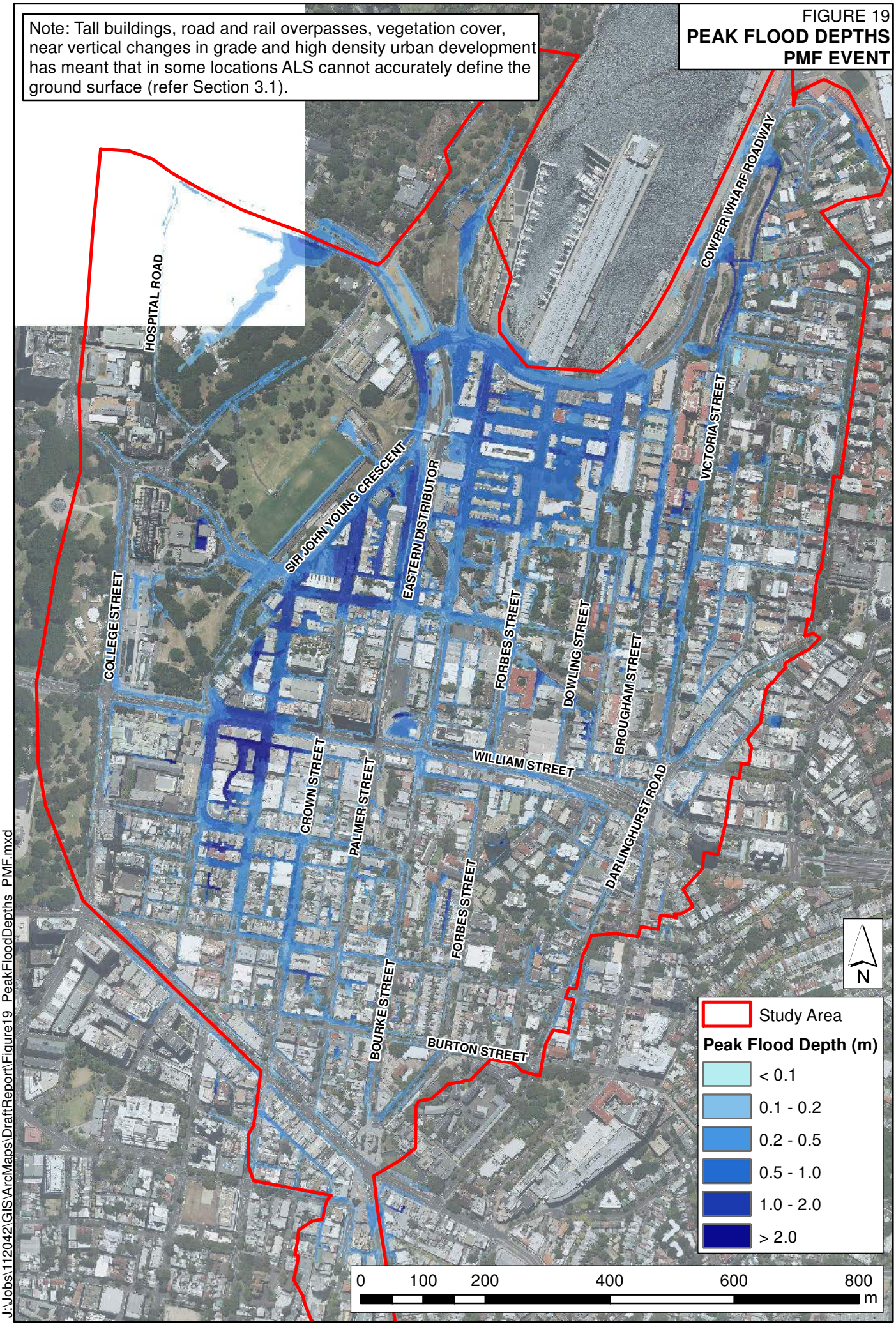
FIGURE 19
PEAK FLOOD DEPTHS
PMF EVENT
Note: Tall buildings, road and rail overpasses, vegetation cover, near vertical changes in grade and high density urban development has meant that in some locations ALS cannot accurately define the ground surface (refer Section 3.1).
HOSPITAL ROAD
COWPER WHARF ROADWAY
VICTORIA STREET
SIR JOHN YOUNG CRESCENT
EASTERN DISTRIBUTOR
COLLEGE STREET
FORBES STREET
DOWLING STREET
BROUGHAM STREET
WILLIAM STREET
CROWN STREET
PALMER STREET
DARLINGHURST ROAD
FORBES STREET
BOURKE STREET
BURTON STREET
N
Study Area
Peak Flood Depth (m)
< 0.1
0.1 - 0.2
0.2 - 0.5
0.5 - 1.0
1.0 - 2.0
> 2.0
0
100
200
400
600
800
m
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Appendix C – HughesTrueman Stormwater DA Report

HughesTrueman Stormwater DA Report for existing OSD (2008)

HughesTrueman

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F 02 9438 4505

stleonards@hughestrueman.com.au

STORMWATER DA REPORT

SCEGGS School
Darlinghurst

MAY 2008

PREPARED BY:	Q.A. CHECK:	CO-ORDINATED:	APPROVED FOR ISSUE:	DATE:
S. REILLY		R. HIGGINS	DRAFT	29 MAY 2008

HughesTrueman

STORMWATER DA REPORT

SCEGGS Darlinghurst

TABLE OF CONTENTS

1.0 INTRODUCTION

This stormwater management plan has been prepared to describe the proposed management of stormwater for the proposed development at the SCEGGS School on Forbes Street Darlinghurst. The site is bounded by Forbes Street to the east, St Peters Street to the north and other lots to the south and west. The site generally has a fall from south to north.

2.0 EXISTING STORMWATER MANGEMENT

2.1 DEVELOPMENT

The SCEGGS School site is located on Forbes Street Darlinghurst. The site currently consists of masonry structures as well as impervious open space used as a car park.

2.2 WATER QUANTITY MANAGEMENT

There is no current stormwater infrastructure located within St Peters Street. There are also currently no water quantity management devices on the site.

3.0 PROPOSED STORMWATER MANGEMENT

3.1 DEVELOPMENT

It is proposed to construct a new lecture theatre and new classrooms on the proposed site with a 3 level basement carpark underneath.

3.2 WATER QUANTITY MANAGEMENT

A DRAINS model was set up for the site as shown in Figure 1 Appendix B and drawing HDA02. It is proposed to install a stormwater drainage system in St Peters Street. Pipes are to be 375mm diameter RCP with a pit to collect runoff from the proposed building via detention storage and a pit to collect runoff from the existing site catchment via a piped system through the proposed building. The detention basin will be located in the basement of the proposed building. There is assumed to be no road catchment for any of the proposed pits as St Peters Street has a one way cross fall away from the site. Therefore all surcharging from the pits if any is assumed to sheet across to the opposite side of St Peters Street.

The assumed pipe invert levels, lengths and slopes are as follows:

Pipe	From	To	U/S Invert	D/S Invert	Length (m)	Slope
Pipe 1	Pit 1	Pit 2	25	24.6	25	1.6%
Pipe 2	Pit 2	Pit 3	24.6	23	25	6.4%

The site was split up into 3 different catchments, the proposed new building and existing site which run to the proposed stormwater system and the areas draining offsite which bypass the system. This is shown in drawing HDA02.

The catchment areas and percentage impervious for the 2 catchments running to the proposed stormwater system are as follows:

Catchment	Catchment Area (m^2)	% Impervious
Existing Site	4200	90
Proposed Building	1585	100

From this DRAINS model the following hydraulic grade lines for pipes 1 and 2 were determined as shown in Figures 2 and 3.

Figure 2: Hydraulic Grade Line in Pipe 1

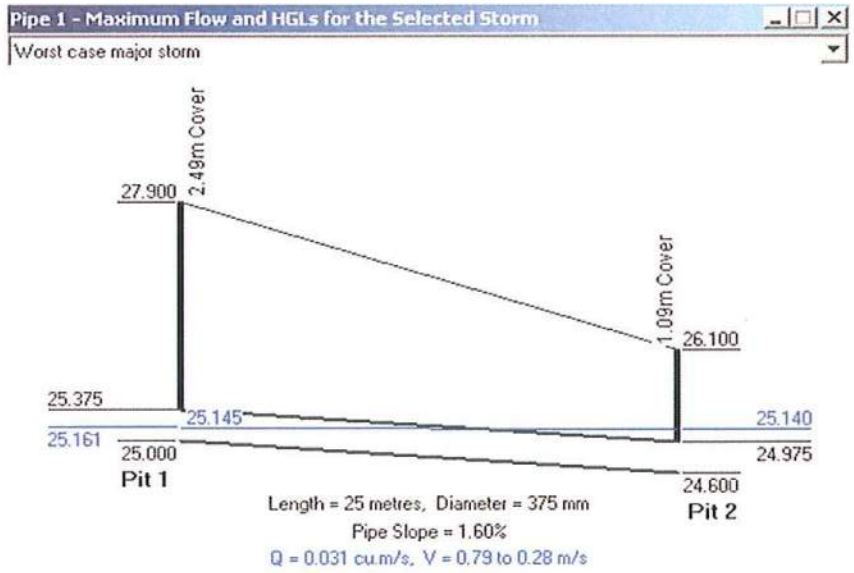
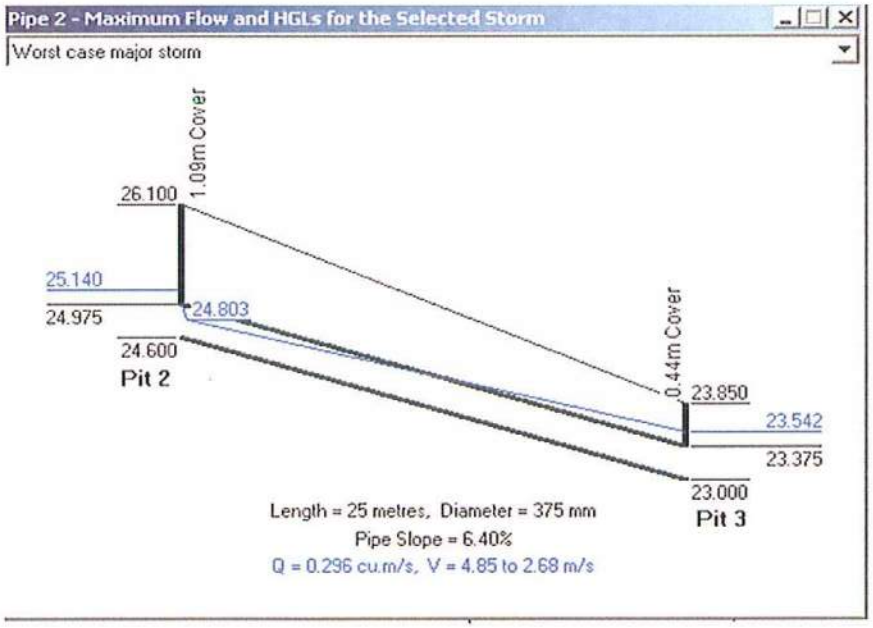


Figure 3: Hydraulic Grade Line in Pipe 2



3.2.1 On-Site Detention Requirements

From Sydney Waters advice letter dated 29th February 2008 it was advised that a minimum on-site detention storage of 67m^3 would be required with a maximum permitted site discharge of 31 litres/sec (0.031m^3/s) for a 100 year ARI storm.

In the DRAINS model the detention basin was sized to have a volume of 87 m^3 and an orifice diameter of 98mm so as to obtain a site discharge of 0.031 m^3/s. However as it is proposed to have a combined rainwater reuse tank/detention system and Sydney Water states in there letter that they allow 50% of the required detention requirement to be offset if rainwater tanks are to be used. Therefore a detention tank will have to be installed in accordance with Sydney Water requirements with a volume of 67m^3.

Full DRAINS input and Output can be seen in Appendix B.

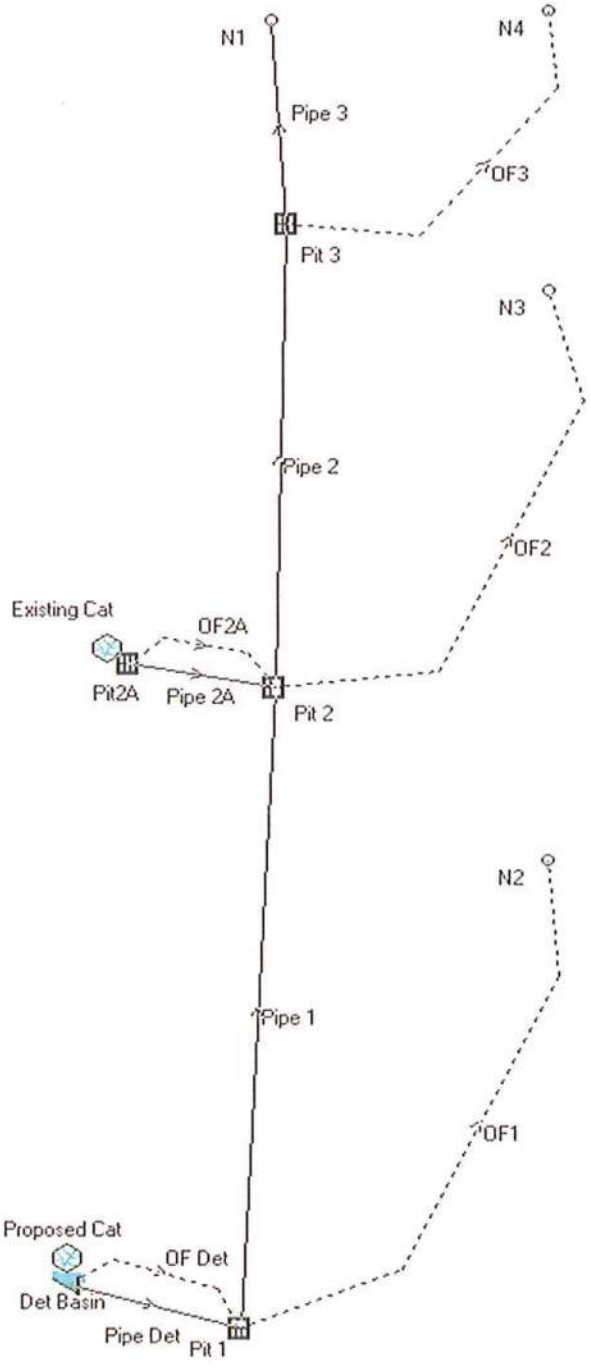
4.0 CONCLUSION

The proposed Development at SCEGGS School Darlinghurst requires an on-site detention basin of 67 m^3 in accordance with Sydney Water's on-site detention advice. The basin is to be discharged into a new stormwater system in St Peters Street with a 375mm dia pipe, which connects into the existing trunk main in Bourke Street.

APPENDIX A – DRAWINGS

APPENDIX B – DRAINS DATA

Figure 1: DRAINS Layout for the proposed site



Appendix D – City of Sydney Local Environmental Plan Acid Sulfate Soils Classification

Sydney Local Environmental Plan 2012

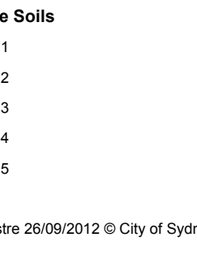
Acid Sulfate Soils Map - Sheet ASS_022

Acid Sulfate Soils

- 1 Class 1
- 2 Class 2
- 3 Class 3
- 4 Class 4
- 5 Class 5

Cadastre

Cadastre 26/09/2012 © City of Sydney



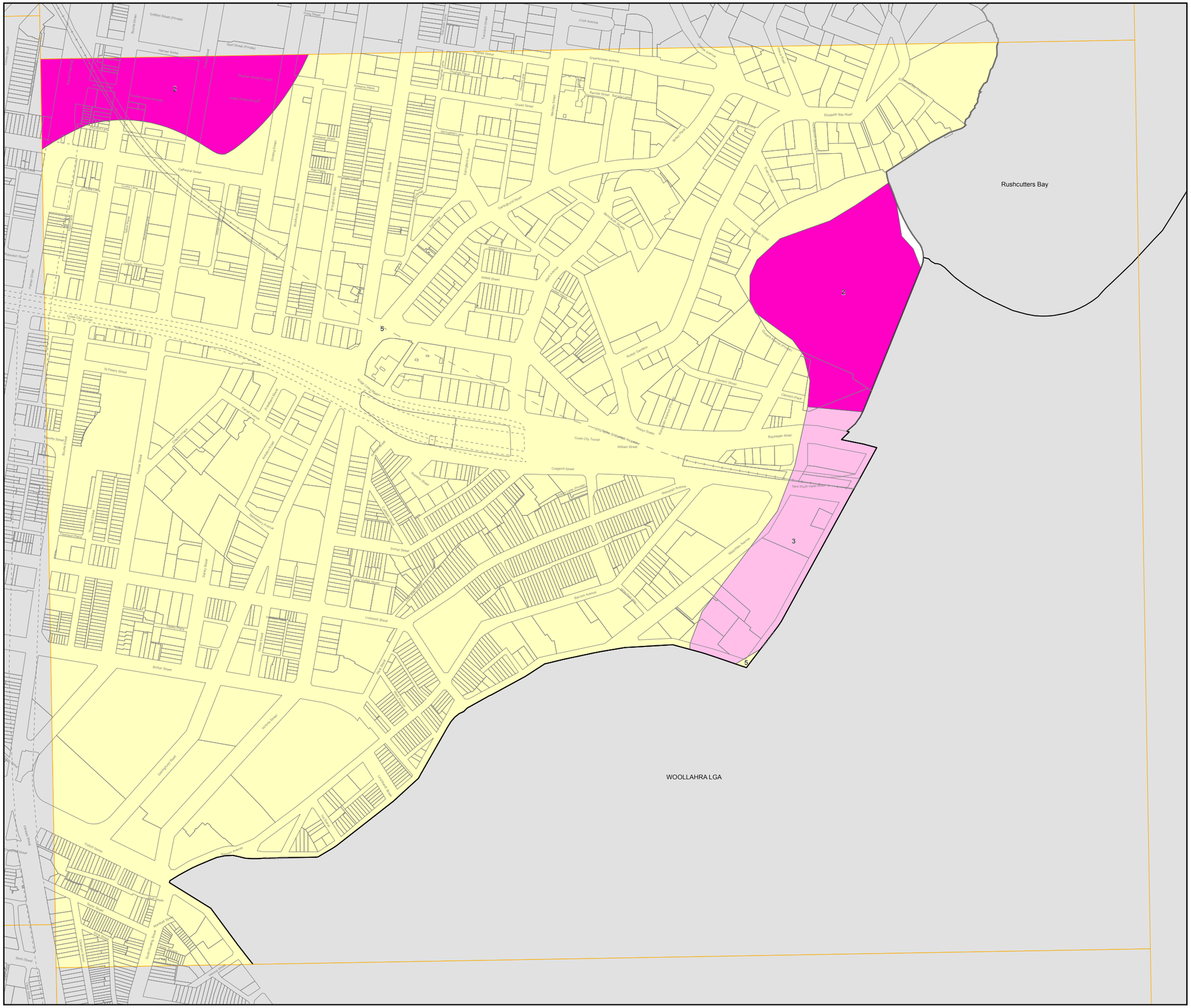
N

0 200 m

Scale: 1:5,000 @ A3

Projection: GDA 1994
Zone 56

Map identification number:
7200_COM_ASS_022_005_20120926



Appendix E – Sediment and Erosion Control Plan

Northrop Drawings DAC01.11, DAC02.01 and DAC02.11

NOTE: ALL CIVIL ENGINEERING CONSTRUCTION WORKS TO BE CARRIED OUT IN ACCORDANCE WITH CITY OF SYDNEY COUNCIL DEVELOPMENT GUIDELINES .THE AFOREMENTIONED GUIDELINES INCLUSIVE OF ALL SPECIFICATIONS TAKE PRECEDENCE OVER NOTES PROVIDED BELOW.

ACCESS AND SAFETY

1. THE CONTRACTOR SHALL COMPLY WITH ALL STATUTORY AND INDUSTRIAL REQUIREMENTS FOR PROVISION OF A SAFE WORKING ENVIRONMENT INCLUDING TRAFFIC CONTROL.
2. THE CONTRACTOR SHALL PROVIDE TRAFFIC MANAGEMENT PLANS FOR THE PROPOSED WORKS COMPLETED BY A SUITABLY QUALIFIED PERSON AND APPROVED BY COUNCIL / REGULATORY AUTHORITY. WORK IS NOT TO COMMENCE ON SITE PRIOR TO APPROVAL OF TRAFFIC MANAGEMENT SCHEME.
3. THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES ACCESS TO BUILDINGS ADJACENT THE WORKS IS NOT DISRUPTED.
4. WHERE NECESSARY THE CONTRACTOR SHALL PROVIDE SAFE PASSAGE OF VEHICLES AND/OR PEDESTRIANS THROUGH OR BY THE SITE.
5. THE CONTRACTOR SHALL ENSURE PUBLIC ACCESS EXTERNAL TO THE SITE IS IN ACCORDANCE WITH COUNCILS / AUTHORITY / SITE MANAGERS REQUIREMENTS.

LANDSCAPING

1. REFER TO DRAWINGS BY OTHERS FOR DETAILS OF PROPOSED LANDSCAPING TREATMENT.
2. IF NO LANDSCAPING PLANS EXIST OR PLANS DO NOT SPECIFY GENERAL SURFACE STABILISATION THEN ALL DISTURBED SURFACE TO BE TEMPORARILY STABILISED WITH HYDROMULCH UPON COMPLETION OF WORKS. A 500mm STRIP OF TURF (CT2 COUCH) IS TO BE PLACED BEHIND ALL NEW KERB.

SEDIMENT AND SOIL EROSION

1. THE SEDIMENT & EROSION CONTROL PLAN PRESENTS CONCEPTS ONLY. THE CONTRACTOR SHALL AT ALL TIMES BE RESPONSIBLE FOR THE ESTABLISHMENT & MANAGEMENT OF A DETAILED SCHEME MEETING COUNCILS AND OTHER REGULATORY AUTHORITY REQUIREMENTS AND MAKE PAYMENT OF ALL FEES.
2. THE CONTRACTOR SHALL INSTIGATE ALL SEDIMENT AND EROSION CONTROL MEASURES IN ACCORDANCE WITH STATUTORY REQUIREMENTS AND IN PARTICULAR THE 'BLUE BOOK' (MANAGING URBAN STORMWATER SOILS AND CONSTRUCTION), PRODUCED BY THE DEPARTMENT OF HOUSING AND COUNCILS POLICIES. THESE MEASURES ARE TO BE INSPECTED AND MAINTAINED ON A DAILY BASIS.
3. THE CONTRACTOR SHALL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE LOCATED AS INSTRUCTED IN THE DRAWINGS AND ADHERE TO ALL REGULATORY AUTHORITY REQUIREMENTS.
4. THE CONTRACTOR SHALL INFORM ALL SUB CONTRACTORS OF THEIR RESPONSIBILITIES IN MINIMISING THE POTENTIAL FOR SOIL EROSION AND POLLUTION TO DOWNSTREAM LANDS AND WATERWAYS.
5. WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE SHALL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE;
   5.1. CONSTRUCT TEMPORARY STABILISED SITE ACCESS INCLUSIVE OF SHAKE DOWN / WASH PAD.
   5.2. INSTALL ALL TEMPORARY SEDIMENT FENCES AND BARRIER FENCES. WHERE FENCES ADJACENT EACH OTHER, THE SEDIMENT FENCE CAN BE INCORPORATED INTO THE BARRIER FENCE.
   5.3. INSTALL SEDIMENT CONTROL MEASURES AS OUTLINED ON THE APPROVED PLANS.
6. UNDERTAKE SITE DEVELOPMENT WORKS SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF MINIMUM WORKABLE SIZE.
7. AT ALL TIMES AND IN PARTICULAR DURING WINDY AND DRY WEATHER, LARGE UNPROTECTED AREAS WILL BE STABILISED / KEPT MOIST (NOT WET) TO KEEP DUST UNDER CONTROL ENSURING CONFORMITY TO REGULATORY AUTHORITY REQUIREMENTS.
8. ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) SHALL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.
9. WATER SHALL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS THE CATCHMENT AREA HAS BEEN STABILISED AND/OR ANY LIKELY SEDIMENT BEEN FILTERED OUT.
10. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES SHALL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE STABILISED / REHABILITATED.
11. ALLOW FOR GRASS STABILISATION OF EXPOSED AREAS, OPEN CHANNELS AND ROCK BATTERS DURING ALL PHASES OF CONSTRUCTION.
12. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED TO ENSURE THAT THEY OPERATE EFFECTIVELY. REPAIRS AND/OR MAINTENANCE SHALL BE UNDERTAKEN REGULARLY AND AS REQUIRED, PARTICULARLY FOLLOWING RAIN EVENTS.
13. RECEPTORS FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER SHALL BE DISPOSED OF IN ACCORDANCE WITH REGULATORY AUTHORITY REQUIREMENTS. CONTRACTOR TO PAY ALL FEES AND PROVIDE EVIDENCE OF SAFE DISPOSAL.
14. IF A TEMPORARY SEDIMENT BASIN IS REQUIRED, ENSURE SAFE BATTER SLOPES IN ACCORDANCE WITH THE GEOTECHNICAL REPORT. MAINTAIN ADEQUATE STORAGE VOLUME IN ACCORDANCE WITH PLANS. TEMPORARY PUMP 'CLEAN FLOCCULATED' WATER TO AUTHORITIES STORMWATER SYSTEM. ENSURE WHOLE DISTURBED SITE RUN-OFF IS DIRECTED TO TEMPORARY SEDIMENT BASIN.

SITEWORKS

1. ALL WORKS TO BE IN ACCORDANCE WITH RELEVANT LOCAL COUNCIL / REGULATORY AUTHORITIES REQUIREMENTS, ALL SPECIFICATIONS AND AUSTRALIAN STANDARDS. CONFLICTS BETWEEN SAID DOCUMENTS SHALL BE REFERRED TO THE SUPERINTENDENT FOR DIRECTION.
2. THE CONTRACTOR IS TO REVIEW THE DRAWINGS PRIOR TO PRICING AND COMMENCEMENT AND REPORT ANY DISCREPANCIES TO NORTHROP
3. ANY PRODUCTS SPECIFIED OR USED TO BE VERIFIED BY THE CONTRACTOR AS BEING SAFE AND APPROPRIATE FOR USE. NORTHROP DO NOT TAKE ANY RESPONSIBILITY FOR THE USE OF UNSAFE PRODUCTS
4. THE CONTRACTOR IS TO DESIGN, OBTAIN APPROVALS AND CARRY OUT REQUIRED TEMPORARY TRAFFIC CONTROL PROCEDURES DURING CONSTRUCTION IN ACCORDANCE WITH ALL REGULATORY AUTHORITIES, INCLUSIVE OF LOCAL COUNCIL REGULATIONS AND REQUIREMENTS.
5. THE CONTRACTOR IS TO OBTAIN ALL AUTHORITY APPROVALS AS REQUIRED PRIOR TO COMMENCEMENT OF WORKS.
6. RESTORE ALL PAVED, COVERED, GRASSED AND LANDSCAPED AREAS TO THEIR ORIGINAL CONDITION OR AS DIRECTED BY THE SITE SUPERINTENDENT ON COMPLETION OF WORKS. WHERE PLANTING OF NEW GRASS IS NECESSARY REFER TO LANDSCAPE ARCHITECT AND / OR ARCHITECT DOCUMENTATION.
7. ON COMPLETION OF ANY TRENCHING WORKS, ALL DISTURBED AREAS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION OR AS DIRECTED BY THE SITE SUPERINTENDENT, INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL, GRASSED AREAS AND ROAD PAVEMENTS.
8. THE CONTRACTOR SHALL ARRANGE ALL SURVEY SETOUT TO BE CARRIED OUT BY A REGISTERED SURVEYOR PRIOR TO COMMENCEMENT OF WORKS.THE CONTRACTOR IS TO ENSURE THAT SURVEY BOUNDARIES ARE DERIVED FROM A CADASTRAL SURVEY RATHER THAN A DETAIL SURVEY.
9. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND EXISTING LEVELS ONSITE PRIOR TO LODGMENT OF TENDER AND ONSITE WORKS. THE PRICE AS TENDERED SHALL BE INCLUSIVE OF ALL WORKS SHOWN ON THE TENDER PROJECT DRAWINGS. ADDITIONAL PAYMENTS FOR WORKS SHOWN ON THE TENDER PROJECT DRAWINGS WILL NOT BE APPROVED.
10. DO NOT OBTAIN DIMENSIONS BY SCALING DRAWINGS.
11. IN CASE OF DOUBT OR DISCREPANCY REFER TO SUPERINTENDENT FOR CLARIFICATION OR CONFIRMATION PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
12. WHERE NEW WORKS ABUT EXISTING THE CONTRACTOR SHALL ENSURE THAT A SMOOTH EVEN PROFILE, FREE FROM ABRUPT CHANGES IS OBTAINED. MAKE SMOOTH TRANSITION TO EXISTING FEATURES AND MAKE GOOD WHERE JOINED.
13. TRENCHES THROUGH EXISTING ROAD AND CONCRETE PAVEMENTS SHALL BE SAWCUT TO FULL DEPTH OF CONCRETE AND A MIN 50mm IN BITUMINOUS PAVING.
14. ALL CIVIL ENGINEERING DESIGN HAS BEEN DOCUMENTED UNDER THE ASSUMPTION THAT ALL NECESSARY SITE CONTAMINATION REMEDIATION WORKS HAVE BEEN SATISFACTORILY COMPLETED (IF APPLICABLE) AND THAT THE SITE IS NOT AFFECTED BY ANY SOIL STRATA OR GROUNDWATER TABLE CONTAMINATION.
15. NOTES ON DETAILS PROVIDED TAKE PRECEDENCE OVER SPECIFICATION NOTES UNLESS IN CONTRADICTION WITH COUNCIL/AUTHORITY SPECIFICATIONS/DETAILS. CONTRACTOR TO CONSULT WITH NORTHROP FOR ANY DISCREPANCIES.
16. IF THE CONTRACTOR DISCOVERS HAZARDOUS/CONTAMINATED MATERIAL THE CONTRACTOR SHALL CONSULT WITH AN ENVIRONMENTAL SPECIALIST.
17. THE CONTRACTOR IS RESPONSIBLE FOR DEALING WITH COMMUNITY COMPLAINTS ASSOCIATED WITH THE WORKS UNDER THE CONTRACT AND TO COMPENSATE FOR/RECTIFY ANY DAMAGE REASONABLY CAUSED BY THE CONTRACTOR.
18. THE TERM 'MAKE GOOD' OR 'MAKE NEAT' IS IN REFERENCE TO THE SATISFACTION OF NORTHROP OR CERTIFYING ENGINEER. THE CONTRACTOR IS TO SEEK CLARIFICATION FROM NORTHROP OR THE CERTIFYING ENGINEER IF NECESSARY
19. TOLERANCES TO BE IN ACCORDANCE WITH COUNCIL/AUTHORITY REQUIREMENTS. IN ABSENCE OF COUNCIL/AUTHORITY SPECIFICATIONS THE FOLLOWING TOLERANCES APPLY:

xxx
xxx
xxx

SERVICE TRENCHES

20. SAWCUT EXISTING SURFACES PRIOR TO EXCAVATION. BACKFILL ALL TRENCHES UNDER EXISTING ROADS, PAVEMENTS AND PATHS WITH STABILISED SAND 5% CEMENT OR DGS40 MATERIAL (5% CEMENT) COMPACTED IN 200mm THICK LAYERS TO 98% MMDD TO UNDERSIDE OF PAVEMENT.
21. BACKFILL ALL TRENCHES NOT UNDER ROADS, PAVEMENTS, PATHS AND BUILDINGS WITH APPROVED EXCAVATED OR IMPORTED MATERIAL COMPACTED TO 95% SMDD.

EXISTING SERVICES

1. ALL UTILITY SERVICES INDICATED ON THE DRAWINGS ORIGINATE FROM SUPPLIED DATA OR DIAL BEFORE YOU DIG SEARCHES, THEREFORE THEIR ACCURACY AND COMPLETENESS IS NOT GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE AND CONFIRM THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE SUPERINTENDENT. CLEARANCES SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY. NOTE SERVICE AUTHORITY REQUIREMENTS FOR LOCATING OF SERVICES PRIOR TO COMMENCEMENT OF WORKS.
2. CARE TO BE TAKEN WHEN EXCAVATING NEAR EXISTING SERVICES. NO MECHANICAL EXCAVATIONS ARE TO BE UNDERTAKEN OVER COMMUNICATION, GAS OR ELECTRICAL SERVICES. HAND EXCAVATION ONLY IN THESE AREAS.
3. THE CONTRACTOR SHALL PROTECT AND MAINTAIN ALL EXISTING SERVICES THAT ARE TO BE RETAINED IN THE VICINITY OF THE PROPOSED WORKS. ANY AND ALL DAMAGE TO THESE SERVICES AS A RESULT OF THESE WORKS SHALL BE REPAIRED BY THE CONTRACTOR UNDER THE DIRECTION OF THE SUPERINTENDENT AT THE CONTRACTORS EXPENSE.
4. THE CONTRACTOR SHALL ALLOW IN THE PROGRAM FOR THE ADJUSTMENT (IF REQUIRED) OF EXISTING SERVICES IN AREAS AFFECTED BY WORKS.
5. THE CONTRACTOR SHALL ALLOW IN THE PROGRAM FOR THE CAPPING OFF, EXCAVATION AND REMOVAL (IF REQUIRED) OF EXISTING SERVICES IN AREAS AFFECTED BY WORKS UNLESS DIRECTED OTHERWISE ON THE DRAWINGS OR BY THE SUPERINTENDENT.
6. THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES SERVICES TO ALL BUILDINGS ARE NOT AFFECTED BY THE WORKS AND ARE MAINTAINED AND NOT DISRUPTED.
7. PRIOR TO COMMENCEMENT OF ANY WORKS THE CONTRACTOR SHALL GAIN APPROVAL OF THE PROGRAM FOR THE RELOCATION AND/OR CONSTRUCTION OF TEMPORARY SERVICES AND FOR ANY ASSOCIATED INTERRUPTION OF SUPPLY.
8. THE CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES TO MAINTAIN EXISTING SUPPLY TO BUILDINGS REMAINING IN OPERATION DURING WORKS TO THE SATISFACTION AND APPROVAL OF THE SUPERINTENDENT. ONCE DIVERSION IS COMPLETE AND COMMISSIONED THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT.
9. THE CONTRACTOR IS TO ALLOW TO POTHOLE ANY SERVICES WITHIN A PUBLIC RESERVE WITHIN THE EXTENT OF WORKS (E.G. STORMWATER CROSSINGS).

VERIFIER:
JOB MANAGER:
DESIGNED:
DRAWN:

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DA	VK	XX	GC	16.09.21

CLIENT: Sandrick PROJECT DIRECTIONS

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PROJECT: 2022 SCEGGS WILKINSON DARLINGHURST

DRAWING TITLE: CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION
SPECIFICATION NOTES

JOB NUMBER: 211000
DRAWING NUMBER: DA.C01.11
REVISION: 01
DRAWING SHEET SIZE = A1

Plotted By : VANESSA KHUU
Date : 16.04.2020 2:24 PM
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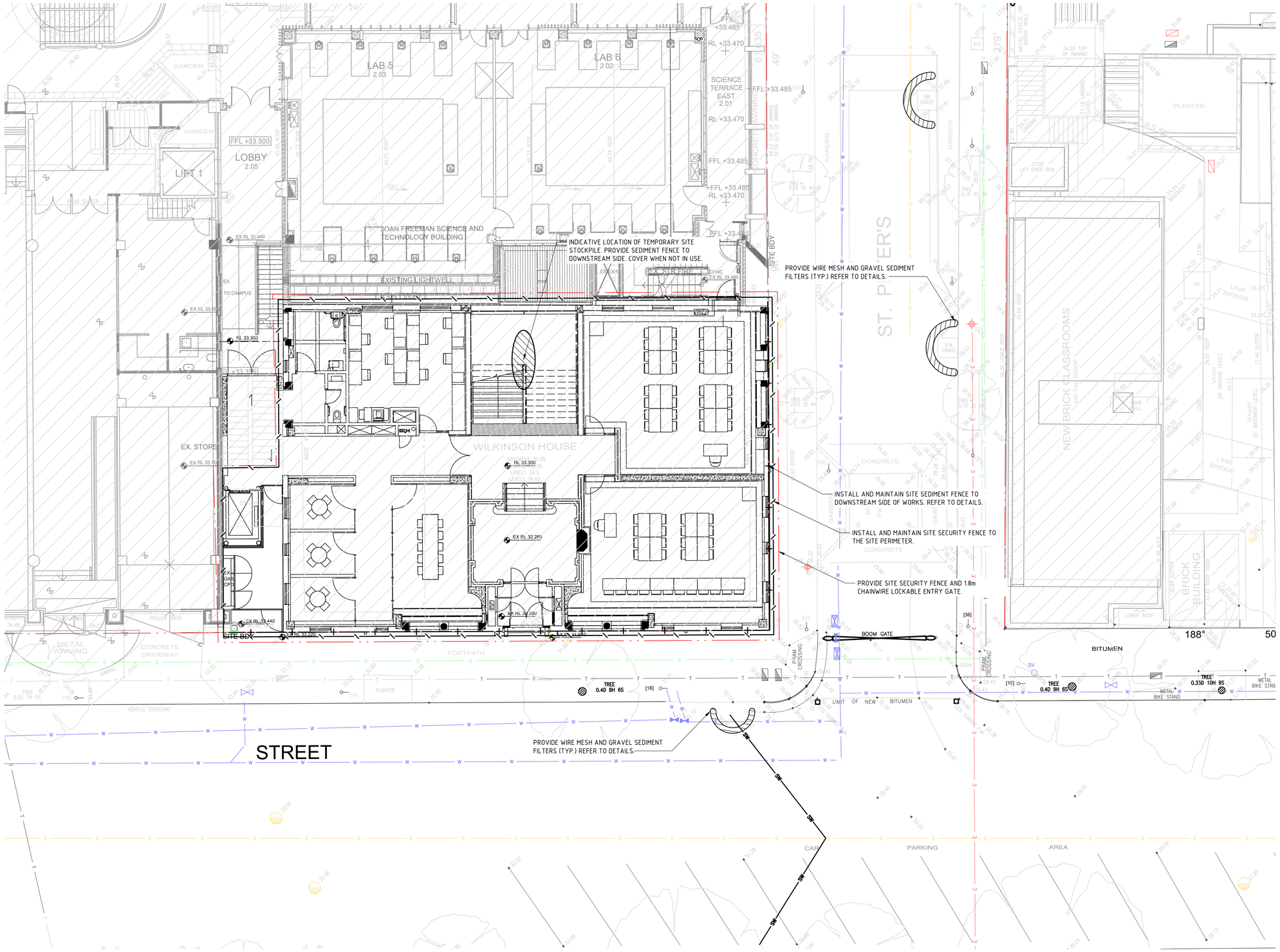

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02	ISSUED FOR DA	GC		GC	21.11.21

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PROJECT
2022 SCEGGS WILKINSON DARLINGHURST

DRAWING TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION
SEDIMENT AND EROSION CONTROL PLAN

JOB NUMBER **211000**
DRAWING NUMBER **DA.C02.01**
REVISION **02**
DRAWING SHEET SIZE = A1

Plotted By: GARETH COLLINS Date: 16.04.2020 2:24 PM
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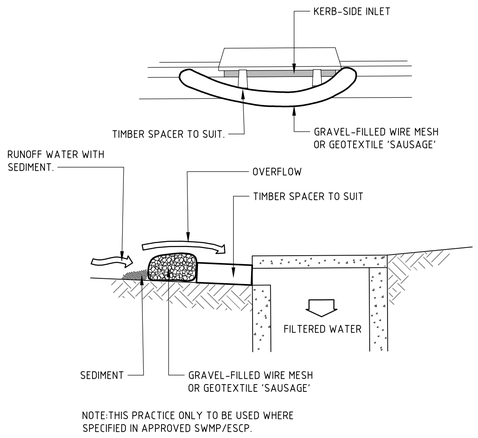
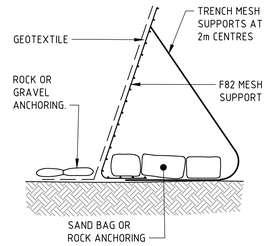


NOTE:THIS PRACTICE ONLY TO BE USED WHERE SPECIFIED IN APPROVED SWMP/ESCP.

CONSTRUCTION NOTES

1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

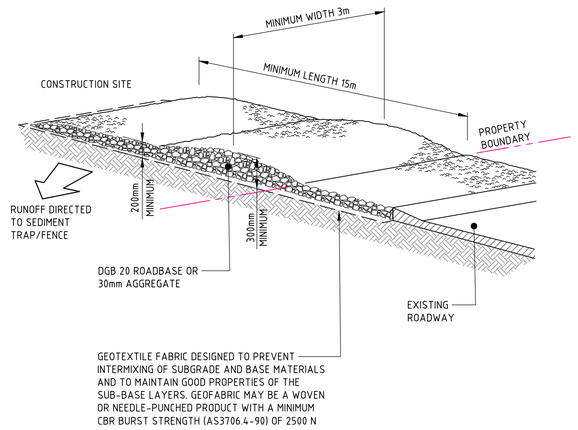
WIRE MESH AND GRAVEL SEDIMENT FILTER



CONSTRUCTION NOTES

1. INSTALL THIS TYPE OF SEDIMENT FENCE WHEN USE OF SUPPORT POSTS IS NOT DESIRABLE OR NOT POSSIBLE. SUCH CONDITIONS MIGHT APPLY, FOR EXAMPLE, WHERE APPROVAL IS GRANTED FROM THE APPROPRIATE AUTHORITIES TO PLACE THESE FENCES IN HIGHLY SENSITIVE ESTUARINE AREAS.
2. USE BENT TRENCH MESH TO SUPPORT THE F82 WELDED MESH FACING AS SHOWN ON THE DRAWING ABOVE. ATTACH THE GEOTEXTILE TO THE WELDED MESH FACING USING UV RESISTANT CABLE TIES.
3. STABILISE THE WHOLE STRUCTURE WITH SANDBAG OR ROCK ANCHORING OVER THE TRENCH MESH AND THE LEADING EDGE OF THE GEOTEXTILE. THE ANCHORING SHOULD BE SUFFICIENTLY LARGE TO ENSURE STABILITY OF THE STRUCTURE IN THE DESIGN STORM EVENT, USUALLY THE 10 -YEAR EVENT.

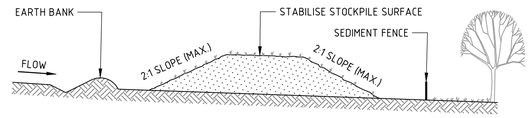
ALTERNATIVE SEDIMENT FENCE



CONSTRUCTION NOTES

1. STRIP THE TOPSOIL, LEVEL THE SITE AND COMPACT THE SUBGRADE.
2. COVER THE AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
3. CONSTRUCT A 200mm THICK PAD OVER THE GEOTEXTILE USING ROAD BASE OR 30mm AGGREGATE.
4. ENSURE THE STRUCTURE IS AT LEAST 15 METRES LONG OR TO BUILDING ALIGNMENT AND AT LEAST 3 METRES WIDE.
5. WHERE A SEDIMENT FENCE JOINS ONTO THE STABILISED ACCESS, CONSTRUCT A HUMP IN THE STABILISED ACCESS TO DIVERT WATER TO THE SEDIMENT FENCE.

STABILISED SITE ACCESS



CONSTRUCTION NOTES

1. PLACE STOCKPILES MORE THAN 2m (PREFERABLY 5m) FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS (STANDARD DRAWING 5-5) ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES (STANDARD DRAWING 6-8) 1 TO 2m DOWNSLOPE.

STOCKPILE

DRAWN: DESIGNED: JOB MANAGER: VERIFIER:

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SCALE 1:100 @ A1 (0 1 2 3 4 5m)

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PROJECT: **2022 SCEGGS WILKINSON DARLINGHURST**

DRAWING TITLE: **CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION**

SEDIMENT AND EROSION CONTROL DETAILS

JOB NUMBER: **211000**

DRAWING NUMBER: **DA.C02.11** REVISION: **01**

DRAWING SHEET SIZE = A1

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